NEW ZEALAND JOURNAL OF Agriculture

SEPTEMBER - 1953

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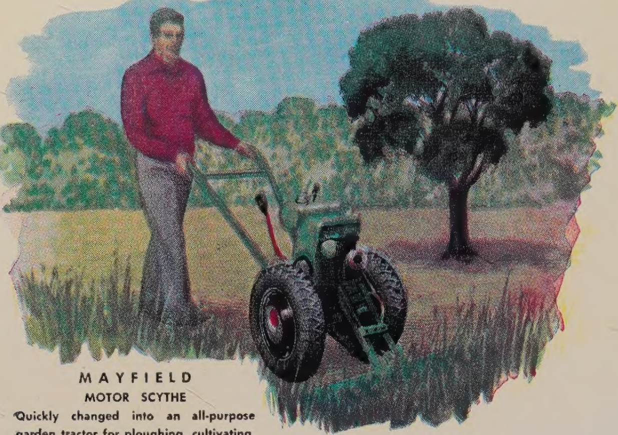

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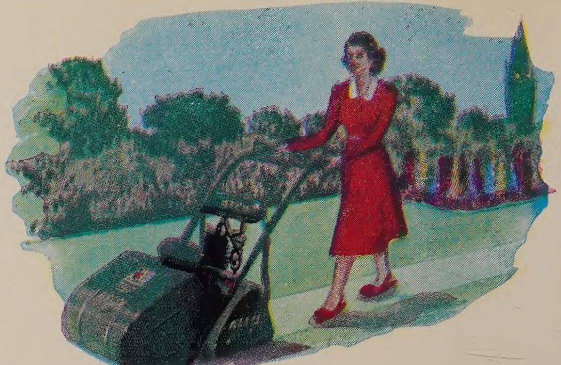

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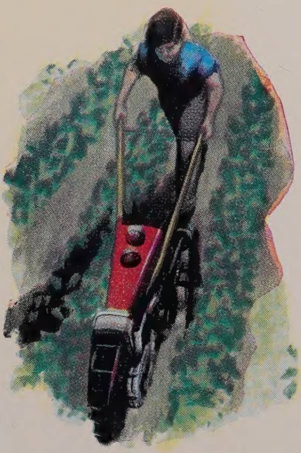

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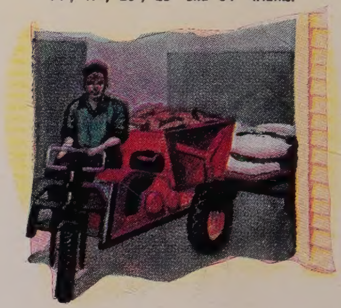

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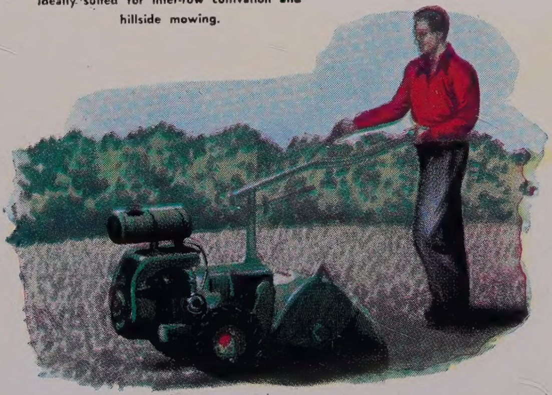

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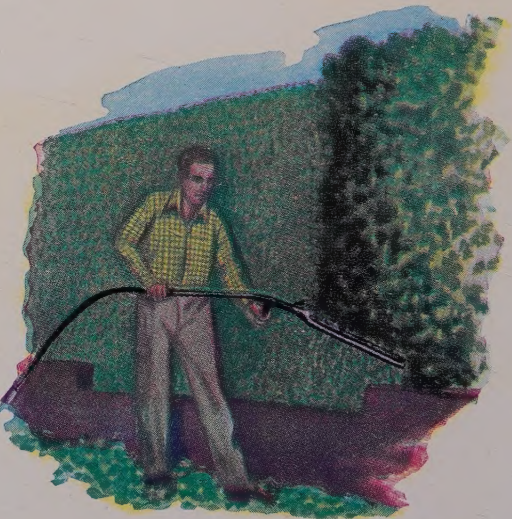

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Volume 87

Number 3

15 September

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(Established 1910)

NEW ZEALAND JOURNAL OF Agriculture

Published by

Direction

of

Hon. K. J. Holyoake,

Minister of Agriculture.

This Month's Cover

The availability in recent years of special mechanical equipment has reduced the labour required to produce market garden crops. This month's cover, which is reproduced from a colour photograph, shows winter vegetables being collected in a tractor trailer on a market garden at Te Ore Ore near Masterton in the Wairarapa. Because of the demand for land for housing and industry there has been a tendency in the last 20 years for vegetable production areas to be established much further from urban areas than formerly. Though at present vegetable growing is not extensive in the Wairarapa, it is expected that the opening of the Rimutaka tunnel, by providing quick access with the Hutt Valley and Wellington, will stimulate vegetable production in the southern part of the district.

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The "Journal" is issued monthly. The subscription within New Zealand is 10s. a year; the overseas subscription is 13s. (sterling). The "Journal" may be ordered from any bookseller or newsagent, or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 2298, Wellington, at 1s. a copy, post free.

Subscription inquiries (preferably accompanied by the address cut from a recent "Journal" wrapper) should be sent to the nearest office of the Department of Agriculture.

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REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE.

Production for 3 Million 25 Years Hence

AN assessment of the levels of farm production that will be needed for New Zealand's expected population of 3 million 25 years from now was made by the Director-General of Agriculture, Mr. E. J. Fawcett, in his annual report to Parliament last month, which is reprinted below. As there is no reason to expect any major change in the country's present dependence on exports of farm produce (about 98 per cent. of total exports), all farmers will be concerned with the estimated production required and the adjustments a larger population, greater local consumption, and increased import requirements will call for. In subsequent issues of the "Journal" a guide to the possibilities of greater primary production will be given in case histories of properties on which marked increases have been achieved under the Department of Agriculture's Farm Improvement Scheme.

Mr. E. J. Fawcett. [*Spencer Digby*

NEW ZEALAND'S dependence on exports of farm produce needs no emphasis, and there is no doubt that this position is likely to continue for many years. It also seems that there will continue to be a demand for New Zealand produce, though it is difficult to forecast the extent to which this demand is likely to be effective; that is, will the price level be satisfactory to producer and consumer?

New Zealand's main exports are dairy produce, wool, and meat, with the by-products of these industries. Approximately 98 per cent. of total exports are farm products and practically all of these are from the livestock industries. The analysis which follows is therefore based on these industries.

It is now possible to look forward with reasonable confidence in this country to a population of 3 million people being attained in about 25 years, and as the present population is almost exactly 2 million, it is an appropriate time to speculate on some of the economic consequences arising as a result of an addition of a million to our population.

On the face of it, it would appear to be merely a matter of adding 50 per cent. to present levels of production, consumption, imports, exports, etc., but in practice the problem is rather more involved. The date by which we will have a population of 3 million is some 25 years ahead and it is, of course, impossible to forecast likely price movements, the development of secondary industry, the extent of overseas borrowings, any major technical improvements in production, and pattern of trade.

It is nevertheless interesting and, I think, valuable to attempt some assessment of what levels of farm production will be needed for a population of 3 million people, with due allowance being made for local consumption, production, and import requirements.

These assessments are based on the following assumptions:—

(a) That the volume of imports per head does not materially alter in the period in question. (This may not be quite valid, in that products of secondary industry may replace some imported goods; on the other hand, development of secondary industry requires expenditure of overseas funds for raw materials and equipment.)

(b) That the pattern of trade will not alter materially; that is, we will continue to depend on the export of meat, wool, and dairy produce, and by-products of these industries. This, too, may not be quite valid, as there will be some increase in the export of timber products, but it is not thought that this will materially alter the pattern.

On these hypotheses the level of the volume of imports will depend on (a) the quantity of exports and (b) the terms of trade or the level of prices of exports in relation to the level of prices of imports.

In recent years the volume of imports has exceeded the volume of exports. In 1951, on the basis of 1936-38 = 100, the volume of exports was 111 and of imports 157, and though this was a year when exports were affected by the waterfront strike, there was still a substantial gain in imports over exports.

The significant point of these figures is that while the volume of imports has exceeded the volume of exports, the terms of trade in meat and dairy produce have been considerably below par, and balance of payments was achieved in these years because of the substantial increase in the price of wool. This provides an interesting statistical confirmation of what is, of course, common knowledge, but it also has an important bearing on the forecasts of production requirements for a population of 3 million people which follow.

Import Requirements

It is not easy to ascertain what level of imports per head would, in fact, be required for 3 million people or any other level of population. Ever since the war it has been necessary to restrict imports because of lack of overseas funds, and in 1951, when some restrictions were lifted, the pent-up demand, coupled with the temporary increase in wool revenue and other factors, resulted in excessive buying and the necessity to impose fairly rigorous exchange control. Up to a point the demand for imported goods is limited only by the buying power of the public.

Probably, however, the year 1950 is as good as any to take as reasonably approaching that very hypothetical state known as normal conditions, and, working from this base, I have endeavoured to estimate the production levels required for a population of 3 million people.

In 1950 imports per head were £82.7; hence on this basis, the total imports for 3 million people would be £248,000,000.

Export Requirements

To pay for these imports, exports will, of course, have to reach approximately the same level. The first table on page 195 gives the break-up by quantities and value of exports in 1950 and the proportion each represented of the total. These same proportions have been applied to the £248,000,000 plus an upward adjustment of 20 per cent. in quantities. This is due to the fact that in 1950 the terms of trade were 125 (1938 = 100), and as it might be unreasonable to anticipate a continuation of the high wool prices which alone were responsible for the terms of trade being favourable, it is clear that with terms of trade at par an increased **volume** of exports would be necessary. The table shows the quantities of exports which would be necessary to meet the import requirements.

Item	1950			For 3 million people		
	Total value £000	Weight tons	Proportion total value per cent.	Total value £000	Weight tons	Weight + 20 per cent. tons
Dairy produce	54,612	283,469	29.7	73,692	382,507	459,007
Meat	32,302	382,000	17.6	43,669	516,400	619,680
Wool	74,653	175,900	40.6	100,737	237,360	284,832
Other, including re-exports	22,186	—	12.1	30,023	—	—
	183,753	—	100.0	248,121	—	—

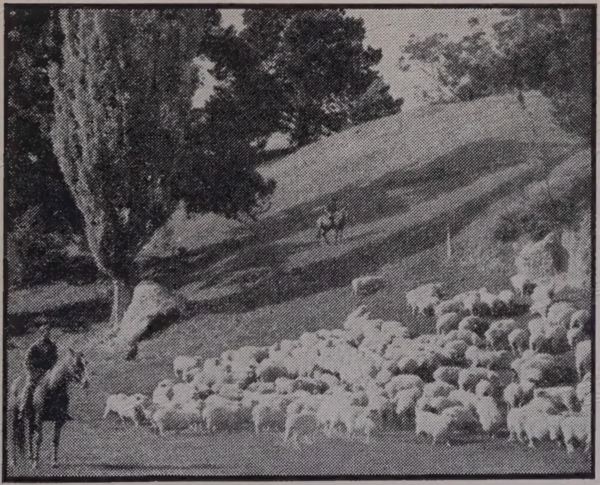
Requirements for Local Consumption

Export requirements are, however, only part of the story, as increased local consumption must be taken into account. Local consumption of meat and some items of dairy produce is a significant proportion of total production.

To assess this item present levels of consumption per head have been taken and multiplied by 3 million. The figures are shown in the following table:—

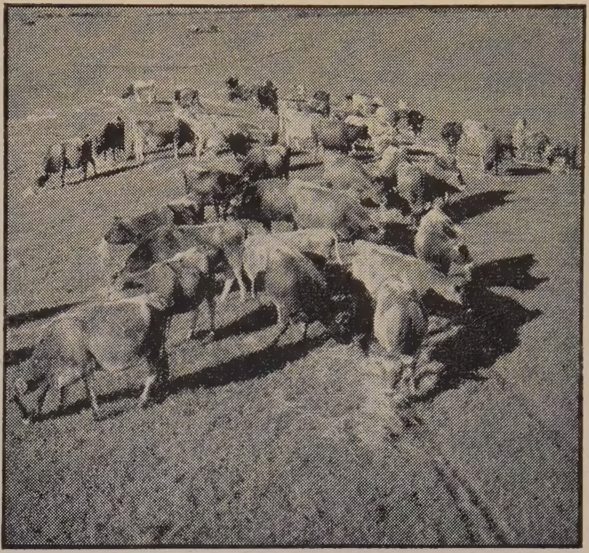
CONSUMPTION REQUIREMENTS OF MEAT AND DAIRY PRODUCE

	Present level per head lb.	Requirement for 3 million people tons
	Dairy produce	
Butter	42.7	57,187
Cheese	5.7	7,634
Milk and cream	46.9 (gals.)	140.7 (m. gals.)
Butterfat equivalent of all dairy produce, including milk powders	59.5	79,687
	Meat	
Beef	108.4	145,735
Veal	5.8	7,895
Mutton	64.0	85,894
Lamb	9.1	12,316
Pig meats	32.7	43,736
Offal	9.7	12,947
Total meat	229.7	308,523



[*Steele*

Of New Zealand's total exports about 98 per cent. are farm products and practically all of these are from the livestock industries. The number of breeding ewes required for a population of 3 million people is expected to be 35,292,600 and the number of dry sheep 19,031,800.



[*National Publicity*

For a population of 3 million people livestock numbers generally will have to rise by 60 per cent., but the increase in the number of dairy cows need not be as high if the production per cow can be raised.

Local consumption of wool is somewhat different. Approximately 4 per cent. of total production of wool is used by local mills.

Summary of Requirements: Export and Local Consumption

It is now possible to summarise the production levels probably required for 3 million people and to compare them with present levels:—

SUMMARY OF REQUIRED INCREASES

Item	Production in 1950	Required for 3 million people			Increases	
		Local consumption	Export	Total	Actual	Percentage
Butterfat (million lb.)	482.6	185.9	583.7	769.6	287.0	59.5
Meat (thousand tons)	577.4	308.5	619.7	928.2	350.8	60.8
Wool (million lb.) ..	390.0	26.4	638.2	664.6	274.6	70.4

The increase required for wool production is somewhat higher than the increases for the other items owing to the fact that in 1950, the base year, it provided 40 per cent. of the export revenue. In practice, changes in the level of wool production are unlikely to exceed those of meat production, and if there is more emphasis on beef output, could even be rather less; thus, a more realistic picture would be obtained by assuming a somewhat lower increase from wool and a corresponding increase in the other items. The general picture is, however, much as presented.

Effect of Varying Terms of Trade

The above calculations assume terms of trade at par. It is not difficult to picture the effect of varying terms, favourable and otherwise. Clearly, if export prices are lower than import costs, it would be necessary, in order to obtain the same level of imports, to increase the volume of exports by a corresponding amount. Conversely, if export prices exceed import costs, lower production levels would cover the required volume of imports.

It is highly probable that in the course of the time which must elapse while population builds up there may be some marked changes in the pattern of trade. At present this seems unlikely. Output of processed milk products, especially non-fat products, should increase, the rate depending on availability of markets. The beef industry may develop, though not necessarily at the expense of mutton and lamb production. The future of wool is somewhat confused by the expanding use of synthetic fibres, but at present it appears that the demand for wool will continue, though prices may be affected. The demand for fibres is necessarily fairly elastic and depends on the general level of prosperity and living standards. New Zealand's marked dependence on wool is in some respects unfortunate, but cannot easily be obviated by developing our other basic lines of primary production. Meat production is essentially tied up with wool, and the future of dairying depends very largely on the area of suitable land and the availability of lucrative markets.

That a demand exists and will continue to develop for foodstuffs of animal origin is undoubtedly true. Such foodstuffs are, however, expensive to produce, because they require a large land area in relation to what is a relatively limited output of food, and in most countries the handling of livestock involves considerable hand labour, much of which cannot be replaced by machines. New Zealand's system of farming permits a high output of animal produce per unit of manpower and consequently a low unit cost for labour. We will thus be very advantageously situated to sell competitively in established markets and to exploit new markets, provided we maintain our relatively favourable position with regard to production costs by wise use of our resources of capital and labour and maintenance of high standards of efficiency and quality.

Livestock and Land Needed to Meet Production Requirements

In this connection it may be of interest to present some assessments of the likely increase in stock numbers which will be needed for a population of 3 million people. These are given in the following table:—

LIVESTOCK NUMBERS REQUIRED

	Number 1949-50*	Requirement for 3 million people	Increases	
			Actual	Percentage
Dairy cows .	1,870,674	†(275lb.) 2,798,500	927,826	49.6
		†(260lb.) 2,960,000	1,089,326	58.2
		†(250lb.) 3,078,400	1,207,726	64.6
Breeding ewes	21,881,467	35,292,600	13,411,133	61.3
Dry sheep ..	11,975,091	19,031,800	7,056,709	58.9
Beef-breeding cows ..	773,461	1,243,341	469,880	60.8

* Livestock numbers in 1949-50 have been taken as a base, because the year 1950 has formed the base of the previous calculations. There have been increases in all classes of livestock between 1950 and 1952.

† It will be noted that if the production per cow can be raised to an average of 275lb. of butterfat, the dairy cow numbers are reduced by nearly 300,000. In general, however, livestock numbers will need to increase by from 50 to 60 per cent.

It is logical to ask what factors are involved in an increase in carrying capacity on this scale. In other words, how are all the extra sheep and cattle to be fed? An increase of 60 per cent. in livestock numbers is one of no small order. If it is assumed that the period permitted is 25 years, this means an average increase per year (arithmetically) of nearly 2½ per cent.

Perhaps it may help to get the problem into better perspective to examine the rates of increase which have taken place in the past. By far the greatest development in our primary industries has taken place since 1920, which more or less marks the beginning of the era of intensive pastoral farming, with increasing recognition of the value of grass as a crop to be sown, cultivated, and utilised as the main and, frequently, the sole feed for the production of milk, meat, and wool.

In the following table increases in livestock numbers between 1919-20 and 1951-52 are traced:—

LIVESTOCK NUMBERS, 1919-20 TO 1951-52

(Figures to nearest thousand, including estimate for cattle inside borough boundaries)

Year	Breeding ewes	Total sheep	Beef-breeding cows and heifers	Cows in milk	Total cattle	Total stock as livestock units
1919-20 ..	11,569	23,915	514	783	3,102	5,568
1929-30 ..	17,564	30,841	528	1,389	3,766	7,323
1939-40 ..	19,728	31,063	707	1,740	4,533	8,054
1944-45 ..	20,866	33,975	766	1,700	4,628	8,510
1949-50 ..	21,881	33,857	773	1,871	4,992	8,808
1951-52 ..	22,833	35,297	851	1,921	5,195	9,177

In 32 years breeding ewe numbers doubled and total sheep increased by 50 per cent., beef-breeding stock by about 60 per cent., and cows in milk by about 145 per cent. The bulk of the increase had also taken place by 1939-40, and subsequent development was retarded by the war and its aftermath. A clearer picture is perhaps obtained by use of a statistical convention by which all classes of stock can be added together as livestock units. These figures are shown in the final column, which indicates that between 1944-45 and 1951-52 total stock increased by 8 per cent. Actually, the greater part of this increase has taken place in the past 3 years, which have been favoured by exceptionally good seasons and excellent returns for all livestock products. The 1952 figures indicated some levelling off in the rate of increase. Thus, the achievement of a continuing rate of increase of the order of 2½ per cent. annually in livestock numbers is no mean task. Even if allowance is made for some improvement in production per cow, enabling the same level to be attained with fewer cows, the increase required would still exceed 2 per cent.

Points Requiring Consideration

A thorough examination of all the factors likely to be involved in any programme for expanding production at this rate is, of course, beyond the scope of this report, but the following are some of the points to which serious consideration must be given in the relatively near future.

Land Settlement, Labour, and Housing

To what extent will further subdivision be necessary? Will there be a tendency for farmers to use rather less permanent labour and concentrate more on casual labour and the use of the agricultural contractor? In either case considerably more houses will be necessary. Should housing policy be directed along the lines of assisting and encouraging the building of more houses in rural areas?

Fertilisers

A 60 per cent. increase in livestock numbers would almost certainly require more than a proportionate increase in fertiliser usage, because it would involve the development of much marginal hill country. Present usage is approximately 800,000 tons yearly. The requirement would probably be in the vicinity of 1,500,000 tons. To what extent can this increase be met by expanding the capacity of existing works, or how many new works would be necessary and where should they be erected? Expansion of fertiliser output is a necessary first step in any development programme.

Handling Facilities

It is unlikely that present transport, port, and processing facilities could handle an increase in output of the order envisaged. What additional freezing works, dairy factories, and port facilities and what improvements and additions to railways, main highways, and back-country roads would be necessary?

Requisites

It would be essential to ensure an adequate supply of the other requisites of production, such as tractors, machinery, fencing wire, etc.

Summary

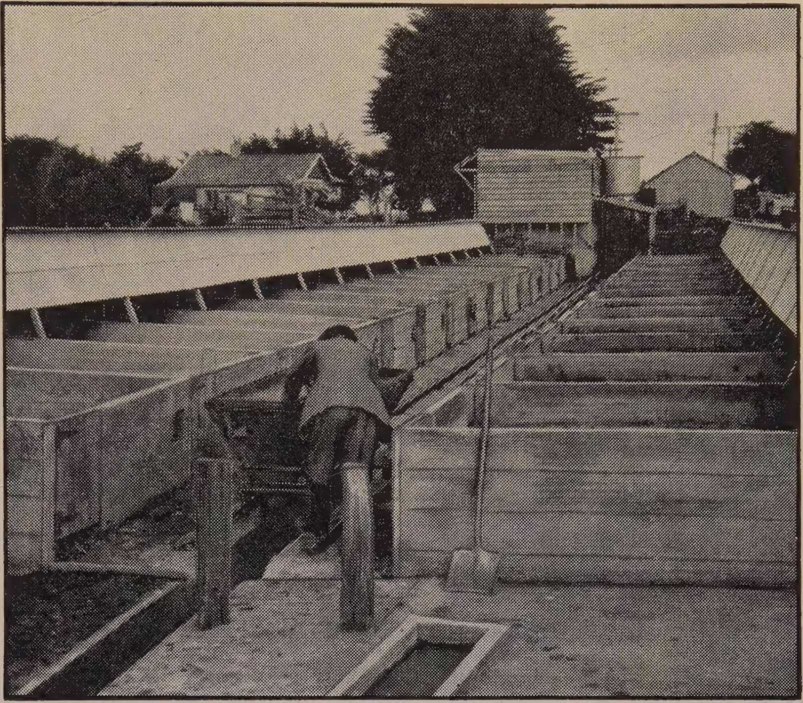
Briefly, the position will be that an increase of a million in New Zealand's population is likely within 25 years. This will involve a 60 per cent. increase in livestock production, or nearly 2½ per cent. per year. This rate was exceeded in the 1920s in special circumstances which are unlikely to be repeated. The achievement of the required increase will necessitate considerable intensification of pastoral farming and expansion of servicing industries and facilities.

Twenty-five years may seem a long period to reach this level of production, but a brief consideration of all the factors involved indicates that a large-scale programme for intensifying pastoral farming should be initiated as soon as possible.

The standard of living of New Zealanders depends on the maintenance of a balance between population and the development of industry, and it is clear that if population is to expand at an average rate of 2 per cent. per year, increase in production must be of at least the same order and a balance in terms of trade must be achieved or some decline in living standards will be inevitable. The rate of population increase can be controlled only to the extent that the rate of immigration can in part be regulated. There are, no doubt, reasons other than economic why a reasonable rate of immigration should be maintained, but it is essential that the development of both primary and secondary industry be correlated with population growth, and this will demand wise and full utilisation of our capital resources.

Correctly Treated Garbage a Valuable Pig Food

GARBAGE, which is defined by the Stock Diseases Regulations 1937, Amendment No. 1, as being meat scraps, discarded meat, meat offal, or kitchen or camp waste, is a useful and valuable food for the feeding of pigs, but it can be dangerous unless handled correctly. In this article by J. C. Cooper, Livestock Instructor, Department of Agriculture, Auckland, the value of garbage as a pig food is discussed and advice on its treatment is given.



Layout of a piggery where garbage is fed. Where pens are facing, one row may be colder than the other, and in exposed positions the provision of shelter is therefore desirable.

THE feeding of farm animals is so closely correlated with the differences in structure of the digestive tracts of these animals that practical precautions in the feeding of stock must be based on these structural differences.

Farm stock are herbivorous animals which can be divided into two classes, those that chew the cud (ruminants) and those that do not (non-ruminants). Sheep and cows are examples of ruminants. Pigs are non-ruminants.

The ruminants differ chiefly from the non-ruminants in having a very complex stomach, consisting of four compartments, the rumen or paunch, the reticulum or honeycomb bag, the omasum, and the abomasum or true stomach. The paunch is large and is a store for the grass and other foods hastily swallowed by the sheep or cow. Food from the paunch is regurgitated in small wads into the mouth, where it is chewed and mixed with saliva. Subsequently it is broken down by enzymes (types of fermenting agencies) and bacteria in the paunch.

This bacterial digestion of fibre in the paunch is the fundamental difference between ruminants and non-ruminants, such as pigs, food for which must not be unduly fibrous but must be similar to human food and be readily digested.

The approximate capacity of the stomach of the cow is 43 gallons, of the sheep 5 gallons, and of the pig 2 gallons.

Briefly, the pig has a small digestive tract and stomach and is not provided with adequate means of dealing with coarse, fibrous fodders. The diet of the pig should consist therefore of nutritious concentrated foods such as cereal grains, meals, or garbage of suitable quality, supplemented with green fodder or roots. On the other hand pigs can utilise large quantities of liquid food, provided the nutrients contained in such foods are easily digested.

To assist the relatively weak digestive system of the pig, foods may be soaked or cooked. Garbage, therefore, if fed correctly, is an excellent pig food.

Warning

Under a section of the Stock Diseases Regulations 1937, Amendment No. 1, it is an offence for any person to acquire garbage for feeding to swine unless he holds a permit issued under these regulations.

This regulation is necessary to prevent the introduction into New Zealand of infectious stock diseases, such as foot and mouth disease and swine fever. The procedure to be adopted to procure a permit is set out later in this article.

Types of Garbage

Different consignments of garbage from the same source are likely to vary from day to day, though these variations usually do not have a material influence on the character of the garbage. However, frequently there are fundamental differences in the character of garbage from different sources.

The constituents of garbage can be divided into three groups:—

1. Roughages such as greens, potatoes, and vegetable peelings and trimmings.

2. Concentrates rich in carbohydrates (sugars) but with a low fibre and protein content, such as bread and puddings.

3. Concentrates with high protein content, such as meat, meat offal, and fish scraps.

The character and value of garbage depend on the amounts of the above three types that it contains, and it is convenient to recognise three grades which differ materially in feeding value.

Grade A

Grade A garbage consists chiefly of roughage such as surplus vegetables, potatoes, and cabbage leaves and other vegetable scraps collected from fruit shops, hotels, etc. This type of garbage can form part of the ration for all pigs, but it is too fibrous to be good food for young pigs. It is more suitable for large pigs and pregnant sows.

Pigs do not fatten on this grade of garbage, but it can form a large part of the ration for pigs of over 60lb. liveweight.

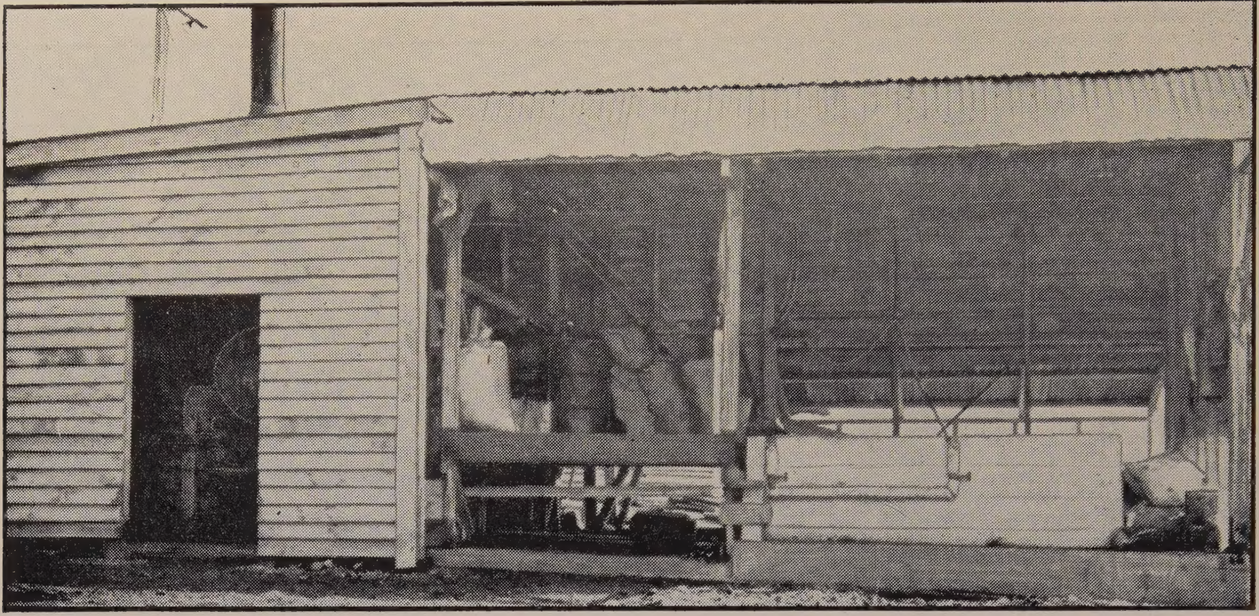
Grade B

Grade B garbage consists mainly of roughages which comprise 70 per cent. of the bulk, the remainder being of concentrates rich in carbohydrates and having a low fibre and protein content. This type of garbage is usually collected from restaurants, canteens, etc.

This grade of garbage can be fed to all types of pigs, but for breeding sows and young pigs it should be supplemented by a meal mixture which has a high protein content. The pigs should also receive fresh green food.

Grade C

Grade C garbage contains both types of concentrates—those rich in sugars and those with a high protein content. They usually form 50 per cent. of the bulk. The remainder is



Front of boiler house, showing landing stage (middle) and concrete sterilising vats (right).

made up of roughage such as potato peelings, which have a low fibre content.

This type of garbage often does not contain sufficient roughage to be a good pig food. It is the usual type used for pig feeding in New Zealand.

Grade C is a highly concentrated food and is commonly fed alone to all types of pigs. Such pigs grow very rapidly and look well, but digestive troubles are liable to cause losses. The incidence of digestive upsets can be reduced by feeding a ration of fresh green stuff.

A balanced pig ration must include:—

Fats and sugars, to supply energy for all body functions, movement, growth, and production.

Proteins, to maintain growth.

Minerals, for bone formation and other essential functions.

Vitamins, to maintain health and constitution.

Water.

Broadly these requirements are met by a mixed diet of adequate quantity and variety. Garbage usually provides such a diet.

The pig's digestive system is similar to that of human beings, and as garbage is mainly kitchen waste, it provides all the ingredients for a balanced diet.

Variations in Quality

There are wide differences of opinion on the value of garbage as a food for pigs. This is a result of considerable variation in the quality of it, which depends on the source and whether or not it has been specially sorted for pig feeding.

Military camps and hotels which sort their garbage for the convenience of a contractor provide the best source of supply. Garbage from restaurants, hospitals, and other institutions is usually less rich in protein and therefore of lower feed value. Some types of unsorted municipal garbage contain large proportions of cinder and other inedible material and are valueless for pig feeding.

Henry and Morrison (U.S.A. 1923) say that 1 ton of average municipal garbage will produce 40lb. of pig meat; Woodman (1941) found in carefully controlled feeding trials in England that 1 ton produced 110lb. of pig meat. This indicates the extent of differences in the average values of swill. There are also considerable variations from day to day in garbage from the same source, variations in the fat content being most important. Care is necessary to ensure that digestive upsets are not caused by these changes, and herein lies the art of feeding this material.

The table below, from Thomas and Hargrave (1931), gives the average composition of raw swills collected from various sources in Newcastle-on-Tyne, England.

Figures such as those shown in the table would vary according to the day-to-day variation in swill.

MEAN PERCENTAGE COMPOSITION OF RAW SWILLS COLLECTED AT NEWCASTLE-ON-TYNE, ENGLAND, AND ANALYSED WEEKLY OVER 6 MONTHS

Source of swill	Moisture	Oil	Crude protein	Carbo-hydrate	Fibre	Mineral matter
Raw swill:						
Hotel	76.53	5.38	5.90	9.58	0.54	2.07
Restaurant	69.63	5.97	5.18	16.81	0.55	1.86
First-class cafe ..	79.22	3.59	2.66	11.79	0.70	2.04
Second-class cafe ..	68.99	6.47	4.73	16.56	0.98	2.27
Dry matter of swill:						
Hotel		22.91	25.14	40.84	2.31	8.80
Restaurant		19.66	17.06	55.36	1.81	6.11
First-class cafe ..		17.29	12.81	56.74	3.36	9.80
Second-class cafe ..		20.89	15.28	53.34	3.15	7.34

Garbage Must be Boiled

As most food scraps are already cooked when collected from hotels and other institutions, some pig owners consider that re-cooking such a bulk of material creates a great deal of unnecessary work, and consequently there is a strong temptation to feed garbage direct to pigs. Such action does not only constitute a breach of the Stock Diseases Regulations 1937, but is wasteful and dangerous.

The danger of the introduction into this country of infectious animal diseases due to viruses has increased greatly with the expansion in recent years of fast air services and because of faster sea transport.

Though quarantine regulations provide protection from direct infection by imported animals, by garbage from ships in ports, or from aircraft landing in New Zealand, the possibility of meat which could be infected being smuggled ashore or of food from overseas aircraft being pilfered cannot be overlooked. Despite all precautions, such offences may occur, and the safest precaution is to make certain that all garbage fed to pigs is boiled properly.

It was for this reason that the Stock Diseases Regulations 1937 were amended in 1943.

Under the Stock Diseases Regulations 1937, Amendment No. 1, a person desirous of collecting scraps from hotels or other institutions for feeding to pigs must first apply to the Department of Agriculture for a permit to acquire garbage. Before such a permit is issued the applicant must install the following equipment for the treatment of garbage:—

1. A steam generating plant capable of raising the temperature of garbage to 212 degrees F. and of maintaining that temperature for not less than 1 hour; or

2. A boiler or boilers of such capacity that the quantity of garbage received by the applicant daily can be boiled effectively for 1 hour.

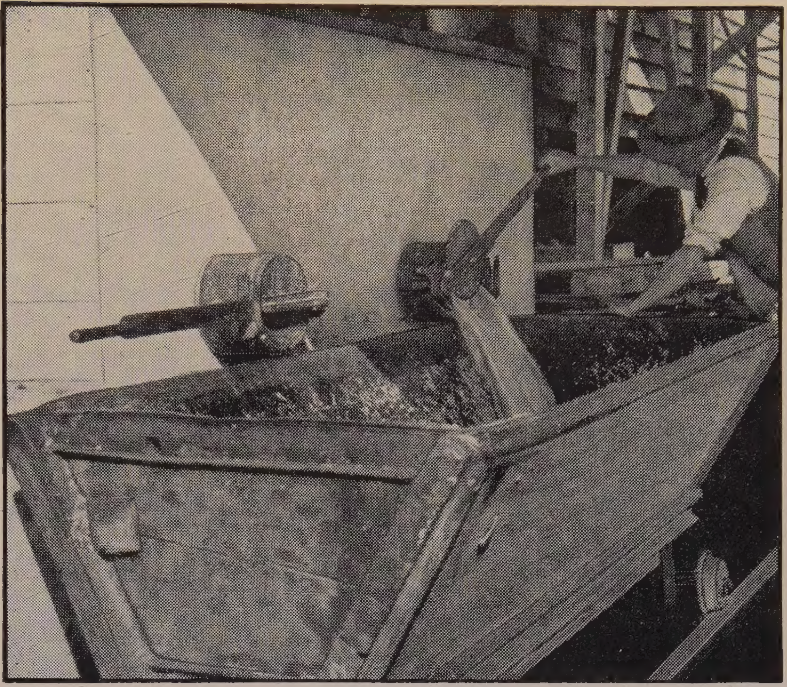
The regulations define boiling thus: To bring the garbage up to a temperature of 212 degress F. and to maintain it at that temperature for 1 hour. To heat it to any temperature below 212 degrees is not satisfactory for destroying all disease organisms.

Steam Preferable

Where steam pressure is used for the boiling of garbage no difficulty is experienced in carrying out the work effectively, easily, and at a low fuel cost, but where ordinary open boilers fired from below and often standing in the open are used the treating of garbage in accordance with the regulations is most difficult and expensive, both in time and fuel.

Steam Plants

Where a large quantity of garbage is handled the most suitable steam-pressure plant is a steam boiler (horizontal preferably) of not less than 3 h.p. which is capable of operating at 100lb. of pressure, is automatically water-fed, and is oil fired with electric fan draught.



Releasing treated garbage into feeding trolly. The release valves are of a guillotine type capable of breaking bones.

A similar plant has been installed on the pig farm of Messrs. Hood and Rowe Limited at Ramarama (25 miles from Auckland), who collect garbage from a military camp and feed about 500 pigs. The pig houses are constructed with concrete floors and each house is supplied with a concrete trough running the full width of the house. The houses are built in two rows, each facing the other, between which is laid a tramway on which runs the trolley conveying the cooked garbage from one end of the piggery to the other. A similar layout is shown in the diagram below.

The plant for treating the garbage consists of an 8 h.p. horizontal steam boiler which is capable of developing a pressure of 200lb. At present this plant handles approximately 300 gallons of garbage daily, but it can handle considerably more.

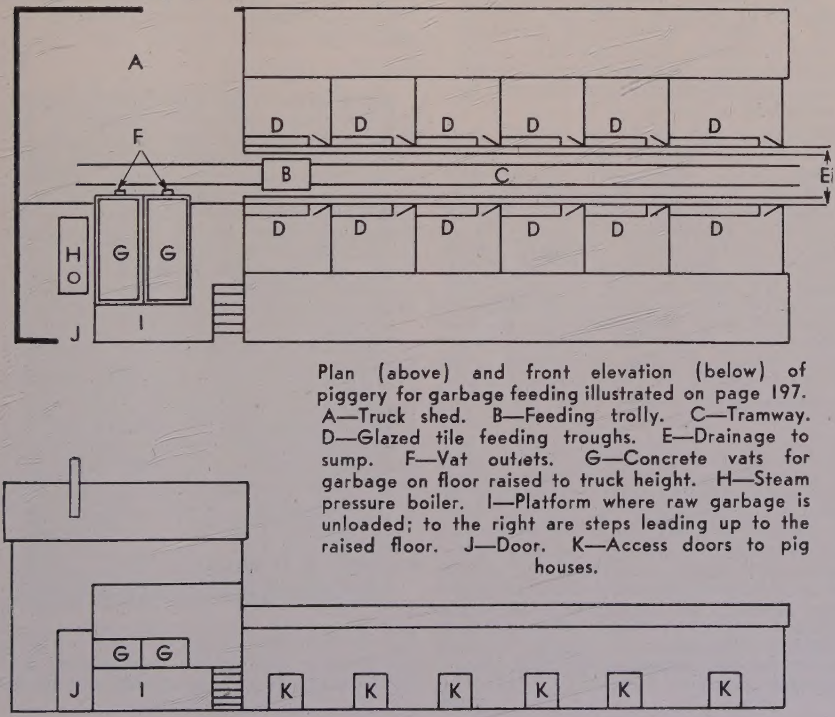
Two large concrete vats are provided and each vat is independently connected at the bottom with the steam pipe from the boiler, the pressure of steam allowed into the vat being controlled by a steam pressure cock. Two vats are necessary where garbage is collected daily to allow one vat to cool off for feeding.

The vats are emptied into the feeding trolley by a circular door let into the end of each vat and operated by a lever to control the flow of boiled garbage.

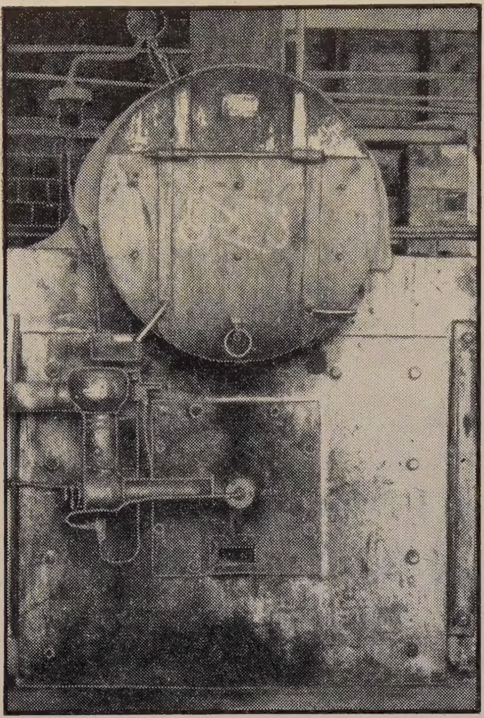
Small Pressure Boiler

There is at present on the market a small steam pressure boiler which is very suitable for the sterilisation of garbage up to about 300 gallons at one time. This is a vertical type oil-fired boiler capable of generating 25lb. of steam. This boiler costs approximately £170. At an extra cost of approximately £25 it can be fitted with a device for automatically replacing the water evaporated. It can then be used continuously without having to be "blown down" for refilling. This type of boiler is very economical in fuel consumption and does the job quite well.

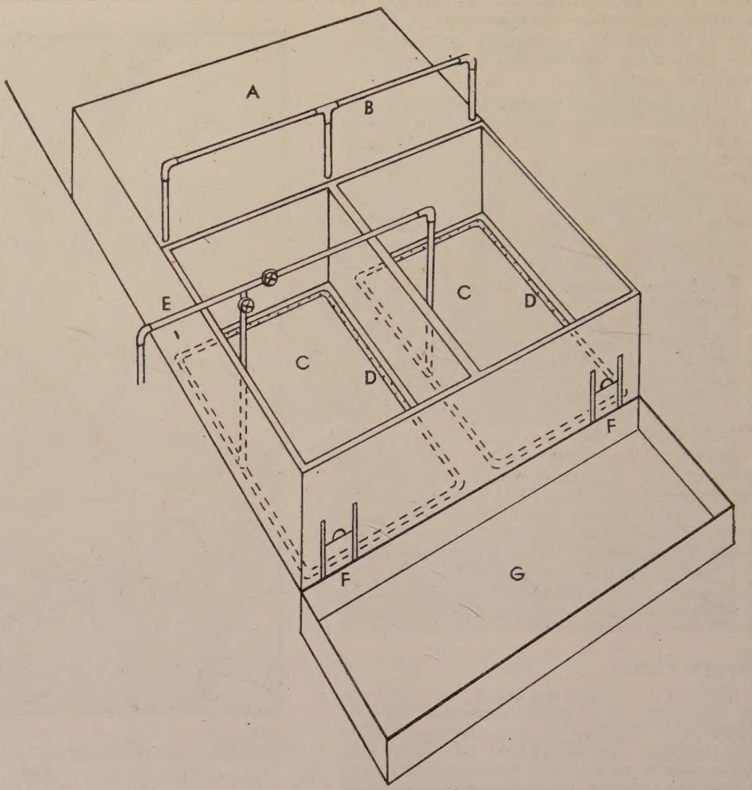
Where a large quantity of garbage is handled it is advisable, of course, to have a larger boiler to save time, as smaller boilers take about 1 hour by the time the boiler has generated sufficient steam to bring a container holding 300 gallons to boiling point. This means that 2 hours are taken to treat this quantity of garbage, because to comply with the provisions of the Stock Diseases Regulations, garbage must be held at boiling temperature for 1 hour.



Plan (above) and front elevation (below) of piggery for garbage feeding illustrated on page 197. A—Truck shed. B—Feeding trolly. C—Tramway. D—Glazed tile feeding troughs. E—Drainage to sump. F—Vat outlets. G—Concrete vats for garbage on floor raised to truck height. H—Steam pressure boiler. I—Platform where raw garbage is unloaded; to the right are steps leading up to the raised floor. J—Door. K—Access doors to pig houses.



An 8 h.p. steam boiler, showing blower feed apparatus fitted to firebox. Crude oil is used for fuel.



Convenient plant for steam treatment of garbage. A—Sorting platform. B—Safety railing. C—Treating vats. D—Perforated steam pipes. E—Steam line from boiler. F—Outlet valves to cooling tank (G).

Steaming in Drums

One good method of treating garbage is to steam it in the drums in which it is collected. A loading platform of sufficient size to hold the drums containing one day's collection is placed near the boiler house and a steam pipe lagged with asbestos is led out over the platform. Dropper pipes, with their lower ends bored with a number of holes for dispersal of the steam and having flexible pipe connections with the main steam pipe, are inserted to the bottom of each drum containing garbage. All the drums are then well covered with sacks and the steaming allowed to continue for 1 hour, after which the steam is turned off and the drums can be emptied individually into the feeding trolly.

During cooling any surplus fat comes to the surface and can then be skimmed off before feeding is proceeded with.

After being emptied the drums are scrubbed out and steam sterilised.

A layout suitable for this method of handling garbage is shown in the diagram at the top of the next page.

For any type of steam boiler or other steam pressure vessel in which steam is used above atmospheric pressure a certificate issued by the Marine Department must be obtained.

Treating in Boilers

On piggeries where a small quantity of garbage is used and where a steam pressure outfit is not warranted the most suitable boiler is a circular type of heavy steel construction securely bricked in to the top in such a way as to allow the flames from the firebox below to fan up the sides of the boiler.

The garbage must be frequently stirred or agitated from the bottom by a paddle to prevent burning and to ensure that any raw meat scraps are properly cooked. In any type of open boiler stirring is essential.

During a test made on boiling garbage it was found that raw meat boiled in a large bulk of garbage failed to cook when the mass was not stirred. About 300 gallons of garbage containing two large pieces of loin of mutton were boiled without being stirred in a square tank for 1½ hours. When the mutton was removed and allowed to become cold it was difficult to tell it from raw mutton. It was returned to the boiler with the garbage boiled on the following day. After 1 hour's boiling and frequent stirring, the mutton was properly cooked.

Discarded square water tanks are used on some piggeries for the boiling of garbage, but they are most unsuitable, especially where daily boiling of garbage is necessary, as the material of which they are constructed is not meant to withstand the constant high heat required to boil garbage daily. In such tanks not only does garbage burn severely at the bottom, but tank bottoms burn through after a few months. Further, a square vessel makes proper agitating difficult if not impossible.

Proper Housing

Whatever plant is provided to treat garbage it must be properly housed in a weatherproof shed. To attempt to boil garbage and especially to hold it at boiling temperature for 1 hour, as required by the regulations, in a boiler exposed to the weather is ridiculous.

Feeding Methods

Fruit and vegetable wastes, which are valuable sources of vitamins A and C, may with advantage be fed raw to pigs. If this practice is followed, however, they must be kept separate during collection and afterward from garbage containing meat scraps, as the definition of garbage in the regulations is such that if fruit and vegetables come in contact with meat, meat scraps, meat offal, or kitchen and camp waste the whole must be boiled.

Potatoes should always be cooked, as their food value is then increased by a third. Raw unripe potatoes cause dietetic upsets. Sprouted potatoes are particularly dangerous and any sprouts must first be broken off and discarded, as they contain the alkaloid poison solanin. Garbage which has been boiled is a much safer food than uncooked swill, it goes further, and is more digestible.

Excess Fat Harmful

Fat is most important in pig nutrition, because the type of fat which a pig consumes decides the solidity of the fat in the animal's body. Fat is the most concentrated heat-giving and fat-forming food ingredient; 1lb. of fat liberates in the body as much heat or energy as 2 to 2½lb. of either sugars or proteins. Thus on a weight basis tallow is worth at least twice the price of meal or grain.

Mixtures which constitute garbage usually supply sufficient fat for pigs. The feeding of excessive quantities of fat is harmful to pigs and is wasteful. It clogs up the digestive system and much is excreted in the animals' droppings.

This is an important reason for boiling garbage. Garbage often contains excessive quantities of fat, and when the garbage is boiled all fats come to the top of the boiler. If this mass is skimmed off, the amount of fat fed to pigs can be controlled.

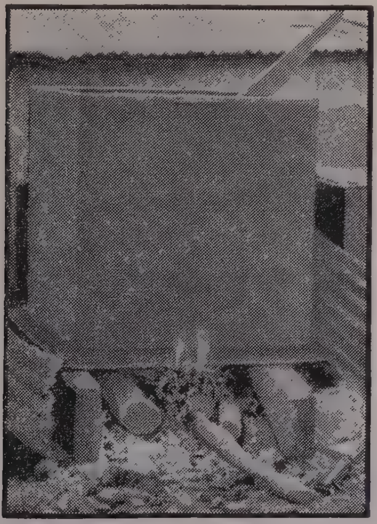
The feeding value of garbage is influenced considerably by the amount of water used in cooking. Only sufficient water should be added before cooking to ensure that all the constituents are floating. This is necessary to simplify cooking and, where a copper or similar container is used, to prevent food burning at the bottom of the boiler.

Some pig producers who use garbage find that to handle the bulky mass of food it is necessary to add a large quantity of water to the garbage. Though this makes the food easy to handle, an excessive amount of fluid in the diet is harmful to young pigs such as weaners. They become pot bellied and unthrifty, and often too much fluid induces scouring.

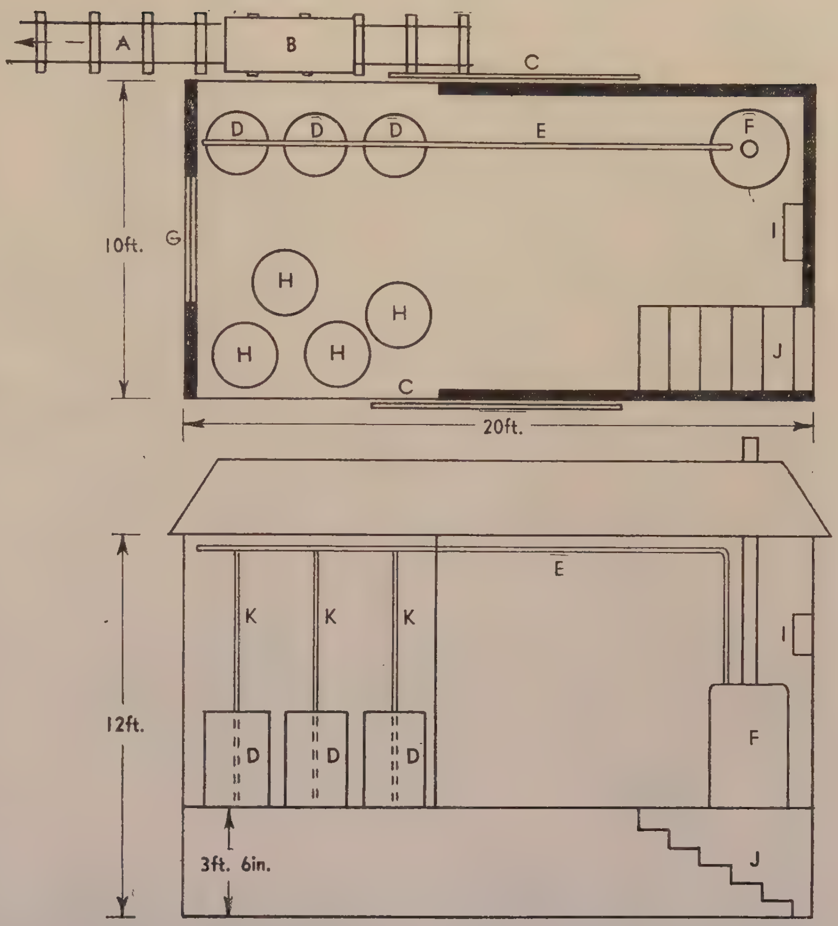
Bulky fibrous food is also detrimental to young pigs, but garbage other than grade A (see page 197) is usually satisfactory in this respect. Pigs should be fed garbage regularly (small pigs three times daily and large pigs twice) and pigs should never be allowed to gorge.

In creep feeding of suckers a little fresh garbage should be kept constantly in front of the litter to prevent gorging or undue fasting.

Ample trough room should be provided, about 1ft. of trough per large pig.



Discarded square water tanks are used for the boiling of garbage on some piggeries, but in many ways they are most unsuitable.



Plan (upper) and side elevation (lower) of cookhouse for small garbage piggery in which garbage is cooked in the drums in which it is collected. A—Tramway or path. B—Tank or trolly into which drums are emptied when the contents are cooked. C—Sliding doors. D—Drums cooking. E—Steam line, which should be just high enough to clear heads of workers. F—Drip-feed, 3-burner, oil-fired boiler generating 25lb. pressure; it will cook not more than three drums at once. G—Window. H—Drums unloaded from collection truck. I—Fuel tank for boiler. J—Steps leading up from door at ground level to cookhouse floor, which is raised 3ft. 6in. or about to the level of the collection truck tray. K—Steam droppers to drums. They should go to the bottoms of the drums.

As a basic food for pigs garbage such as that from hotels and eating houses is considered the best protein food obtainable apart from milk products such as skimmed milk and buttermilk. An advantage which garbage feeding has over feeding based on milk by-products is that the supply and quality of garbage does not vary greatly with the season, whereas pigs fed on dairy by-products may have to rely on a ration low in protein when the dairy herd is out of production, unless meat meal is used.

It is considered that 1½ gallons of boiled garbage of the concentrated type together with greens and fresh water should be sufficient for the daily needs per pig being fattened.

One farmer who uses garbage estimates that 8 gallons of boiled garbage daily and greens will feed 1 sow and fatten her progeny. This might be a satisfactory basis on which to estimate the number of breeding sows and fattening pigs which could be carried on a certain quantity of garbage collected daily.

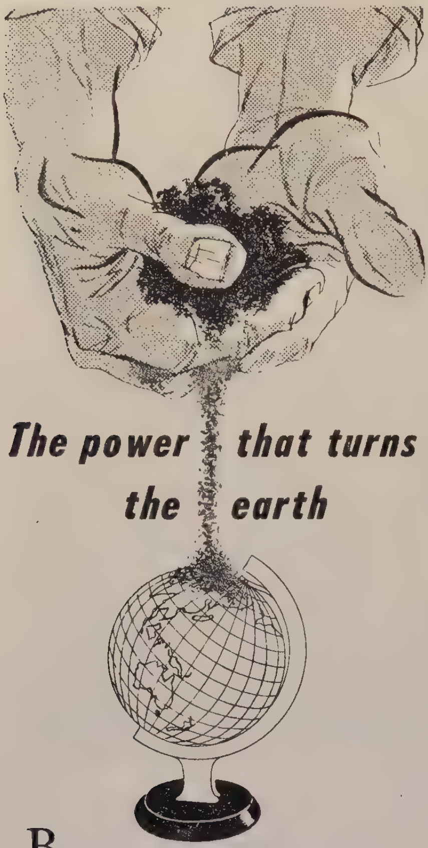
Growth and Carcass Quality

With high-quality garbage containing meat scraps and the soup from the cooking of these good growth is obtained without supplementing the food in any way. Lower-quality garbage must be supplemented by a meal mixture for suckers in the creep and newly weaned pigs until they have become accustomed to their somewhat bulky diet.

After the porker stage is reached pigs usually do very well on garbage and this is an incentive to take them on to heavy baconer weights. However, they tend to develop soft fat and such carcasses are a problem to the bacon curer. For baconer production a substantial part of the finishing ration should consist of barley meal or coconut meal, as this will assist in producing a firmer fat.

Porker Production Favoured

The best system is to breed at the piggery all the pigs required and to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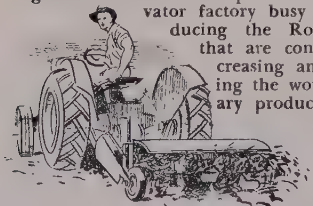

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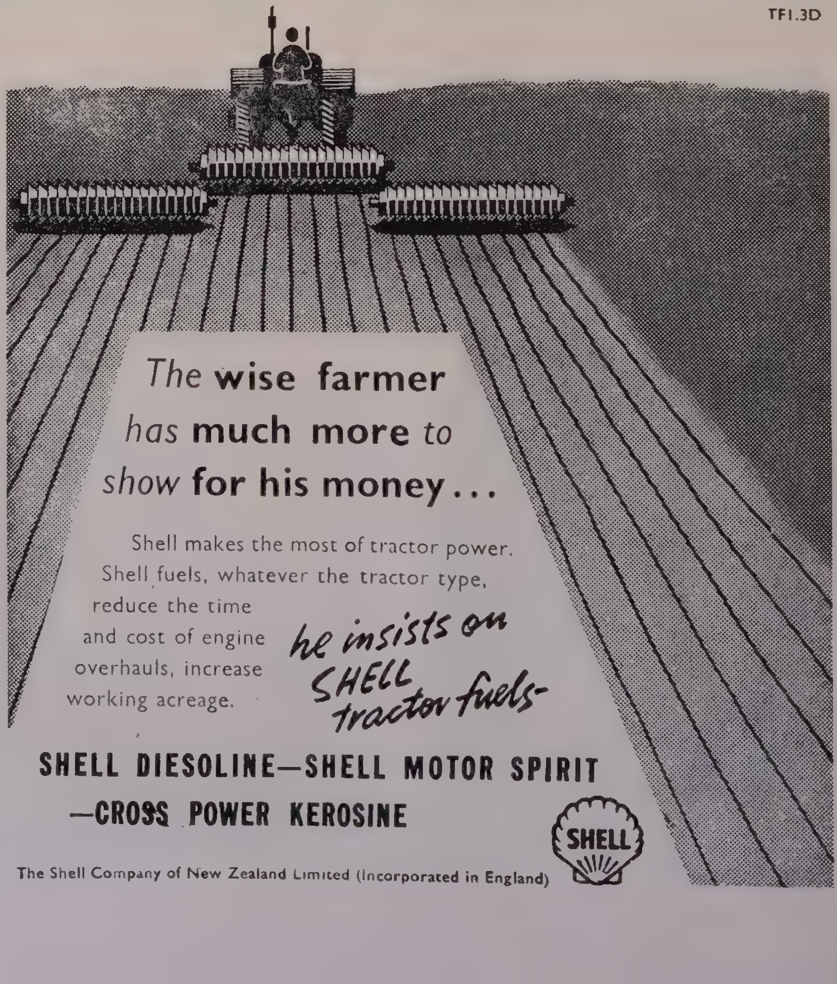

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aim at turning off all pigs as porkers of not more than 90lb. dressed carcass weight. High-quality pork carcasses will be produced, which generally is the most profitable form of pig production.

Prevention of Disease

As garbage is almost a balanced diet for pigs, some common pig ailments associated with nutrition, such as paralysis, acidosis in sows, retention of afterbirth, rickets, failure of sows' milk supply, and infertility in boars, should seldom prove troublesome in piggeries where garbage is fed.

Parasitic Diseases

Pigs fed on garbage are less liable to lung and intestinal worms, as they are usually housed and therefore have no access to worms on pasture and soil.

Vitamin A Paralysis

Pigs fed for long periods on food deficient in vitamin A develop, among other troubles, a degeneration of the nerves supplying the hindquarters, which often leads to paralysis. Vitamin A paralysis is usually found in pigs confined to houses and fed rations deficient in greens. Garbage usually provides sufficient vitamin A from greens and vegetable tops.

Hygiene

Feeding troughs in piggeries where garbage is fed should be kept as clean as those where skimmed milk or other foods are used. Dirty, sour troughs are likely to cause scouring. Bones or other inedible materials must be collected and disposed of regularly.

Garbage should never be fed on the ground, as continual feeding in this way encourages vermin and the area becomes a breeding ground for disease organisms.

Apart from the fact that boiled garbage is more useful as a pig food it is also safer, and the feeding of raw garbage direct from collecting vehicles is an offence. Often kitchen wastes contain rubbish such as razor blades, broken glass, or pieces of tin which if swallowed by pigs could cause losses. Overseas, methods of sieving scraps to overcome this risk have been evolved. Where garbage has been boiled in containers and thoroughly stirred foreign matter usually sinks to the bottom and there is less risk of its finding its way into feeding troughs, especially as it is usually necessary where a small

Often kitchen wastes contain things such as razor blades, broken glass, and pieces of tin which if swallowed by pigs could cause losses.

Garbage should be kept covered until treated. Seagulls often frequent piggeries where garbage is fed and can be disease carriers.

Bulletins for the Pig Farmer

Free Bulletins

Nos.

15 Causes of Excessive Waste in the Pig Industry.
230 Castration of Pigs.
289 Curd for Feeding Pigs.
302 Rejection of Pigs by Works.
323 Stock Losses from Transit Tetany.
328 Foot Troubles in Farm Animals.
334 Piggery Layout.
343 Crops for Wintering Pigs.

Chargeable Bulletins

Nos.

249 Killing Your Own Meat. 6d.
List of Registered Veterinary Surgeons. 1s.

The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

amount of garbage is handled to bucket the garbage out of the boiler into containers to cool down before it is fed out.

It is essential to the welfare of farming in New Zealand generally that garbage should be treated before use. In some countries it has been proved that untreated garbage often spreads diseases such as foot and mouth disease, swine fever, vesicular exanthema, and trichinosis.

In the U.S.A. raw garbage has been found to be a carrier of parasites and micro-organisms dangerous to both man and animals. Sterilisation of raw garbage is a practical method of control of disease liable to be transmitted by raw untreated garbage.

Vesicular Exanthema

The characteristic symptoms of vesicular exanthema are similar in the early stages of the disease to those of foot and mouth disease and it is the opinion of U.S.A. veterinary officials that cattlemen have a vital interest, because co-existence of these vesicular diseases might mask symptoms of foot and mouth disease in the early stages. This could allow rapid spread of infection if an outbreak happened to be foot and mouth disease. For this reason alone vesicular exanthema must not reach New Zealand.

In 1952 vesicular exanthema in pigs in some weeks spread from California, where it had existed for 20 years, throughout the U.S.A. Pigs fed raw garbage were most often affected.

Both trichinosis and vesicular exanthema are spread largely by the commercial feeding of raw garbage.

Trichinosis

Trichinosis, a parasitic disease which has so far not reached this country, is transmissible to humans. If undercooked pork affected with trichinae larvae is eaten by human beings, they can contract the disease trichinosis. It is one of the widespread human diseases in the U.S.A.

Swine Fever

Swine fever, which occurs in pigs only, has appeared in New Zealand on two occasions, but fortunately the spread was checked before serious losses occurred.

Eradication of swine fever in Canada in the last year in which outbreaks were recorded there cost only 600 dollars, whereas in the U.S.A., where vaccination is carried out, mere control of the disease cost between 30 and 40 million dollars.

Regulations almost identical with those controlling the feeding of garbage in New Zealand have been in force in Canada since 1916 and they are rigidly enforced.

Swine fever has been present in the U.S.A. for 120 years. It was first found in Ohio and soon spread throughout the country. The disease remained unchecked for about 75 years, when vaccination was started as a means of checking its spread. As vaccination immunises pigs against swine fever for only about a year, the cost of continued vaccination must be very high.

Garbage is a valuable pig food, but in the interests of New Zealand's economy and to protect all types of farmers it cannot be allowed to become a menace to the health of livestock, and the regulations controlling its handling must be rigidly enforced. Investigations have shown that the raising of pigs on garbage has always been lucrative and is particularly so today because of the good prices for pig meats and the relatively low cost of feeding with garbage.

It would be unfortunate if the carelessness or apathy of a few made it necessary to ban the use of garbage as a pig food. The co-operation of all concerned with the handling and treatment of garbage is needed to minimise risk of spreading diseases.

Reference Books

For those desiring further information on the physiology of the pig's digestive system the following books are recommended:—

"Pigs: Their Feeding and Diseases", by Allan Leslie.

"Feeding Farm Animals", by E. T. Halman and F. H. Gardner.

"Pigs", by V. C. Fishwick.

◆

Use of Offal and Dead Animals from Farms

THERE are numerous losses of stock on farms, particularly in spring, when diseases such as bloat and milk fever are prevalent. Where large quantities of carcasses or offal are available it is preferable to establish a dry-rendering digester plant, the production being either used on the spot or put through a drier and marketed as meat meal.

Smaller supplies of slaughterhouse offal can be cooked by steam as already described for feeding to pigs. If cooking is done in an ordinary copper, the blood has to be discarded, as it burns on to the copper, but blood can be used when the whole is cooked in a steam-jacketed pan or by other steam cooking methods. Offal is a much more valuable food when the blood is retained.

There is usually considerable surplus of fat from offal or carcasses and it is important to skim as much as possible of this off before the cooked offal is fed to pigs. This tallow may be disposed of direct to dairy farmer pig producers whose food supply is normally deficient in fat or further purified and sold elsewhere.

The use of offal as pig food was described in an article "Country Slaughterhouse Piggeries" which appeared in the December 1950 issue of the "Journal".

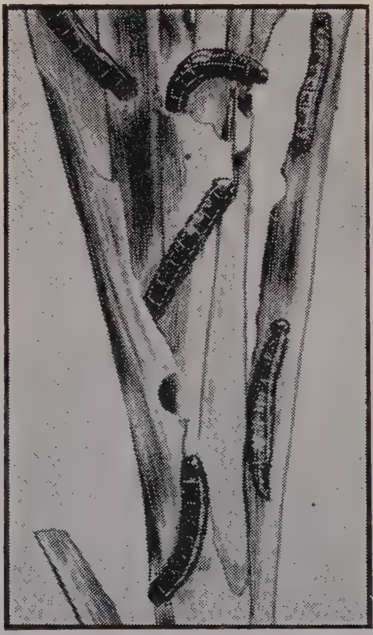
Control of Cutworms by Spreading Poison Baits from the Air

By G. J. GRAHAM, Department of Agriculture, Gisborne

IN mid-December 1952 New Zealand army worms or cutworms (*Cirphis unipuncta*) were making heavy onslaughts on a number of maize crops on the Gisborne flats. Two farmers with areas of 100 acres sprayed their crops with 16 per cent. lindane (gamma isomer of benzene hexachloride) wettable powder at 1½ to 2lb. per acre, applied by sprayer to the rows only, as soon as the cutworms appeared. Many cutworms were killed, but the attack was so severe that the numbers surviving were sufficient to continue severe damage to the crops.

A third farmer tried 50 per cent. colloidal D.D.T. as a spray with similar results. Infestation of his crop was less severe, and he decided to put up with any further loss until pupation of the caterpillars, when damage ceased.

The first two farmers, however, were determined to rout the invaders if possible and they decided to try poison baits. As speed was essential and no other suitable mechanical distributor was available, a Tiger Moth aeroplane fitted for aerial topdressing was given a quick trial to determine the efficiency of the spread of the baits. The results were satisfactory, and sufficient bait made up of a mixture of bran and wettable lindane 16 per cent. powder, with just sufficient water to fuse the two, was prepared for the area. An adjacent flat grass paddock was used as a landing strip, and sowing of the baits on 100 acres was completed in 2 hours. Flying at 40ft. in a slight cross wind, the aeroplane covered a strip of about 3½ chains at each run. Because of shortness of time for preparation, the ground-to-air liaison was not perfect, and some small patches were missed. This did not affect the over-all result, however, the cutworm damage being stopped immediately.


Cutworms (*Cirphis unipuncta*) damaging a maize plant.

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More Farm Production Needed for Rising Population

TIMELY attention to some of the problems likely to arise as our population reaches 3,000,000 some time in the early 1970s is drawn in this year's annual report to Parliament of the Director-General of Agriculture, which is reproduced elsewhere in this issue.

There was a period when New Zealand's population showed a very slow rate of growth and the relatively rapid rate of increase of recent years is largely a post-war phenomenon when a high birth-rate coupled with a vigorous immigration policy has resulted in a net gain of some 40,000 a year, an addition each year of the equivalent of a new Hamilton plus a new Nelson.

It is generally accepted that an increasing population is a desirable feature in any country. It indicates a basically healthy state of affairs and is undoubtedly essential if a country is to develop its natural resources. It enables the overhead burden of essential services such as transport to be lowered to the individual, is important for strategic reasons, and, in a world where in many large regions population is a strain on resources, it is indicative of a sincere desire fully to utilise the national resources of our country.

A static or declining population—and the former must lead to the latter—poses very difficult problems of an ageing population with a consequent decline in the relative size of the all-essential labour force and a burden of unproductive aged people. It must not be lost sight of, however, that an increasing population in its turn raises problems for both industry and administrators. New Zealand is already experiencing some of these, such as the provision of schools, transport facilities, housing, and hospitals, but it is hoped that sufficient leeway will be made up in the next few years to break the back of these problems.

The Director-General of Agriculture has, however, very rightly drawn attention to certain much more basic problems which will become of increasing significance as our population increases, namely the problem of increasing farm production to the extent likely to be needed in the course of the next 20 to 25 years. It appears that even with possible developments in secondary industry and the exploitation of our huge exotic forest resources it will be necessary for farm production to increase at least at the same rate as the population and that this will represent an average rate of increase considerably greater than has taken place over the past 25 years.

More Intensive Methods of Farming Required

As only limited areas of virgin land still await development, most of the required increase will have to be obtained from existing farms by the adoption of more intensive methods. There are some areas where more intensive farming could be undertaken with relatively limited increased capital expenditure. There are others where heavy initial development costs must be incurred to raise carrying capacity.

In a statement in the "Journal of Agriculture" in December 1950 I indicated that though it was difficult to prophesy economic conditions for more than a short time ahead, there was every reason to be optimistic about the future of our primary industries and that there was every justification for investing money in land development. Production and other statistics indicate that in recent years there has in fact been considerable investment in ways and means of increasing farm production.

Fertiliser usage for each of the past two seasons has exceeded 800,000 tons. Of this season's total over 140,000 tons was sown from the air, one of several indications of the interest in improving hill country. Tractor numbers continue to climb by 5000 to 6000 a year and must now exceed 50,000. Imports of hay and silage machinery continue at a high level and, as a result, record acreages of hay and silage have been saved. Livestock numbers in 1952 were all at new record levels and although 1953 figures are not yet available, it is certain that they will be higher again for all major classes of stock.

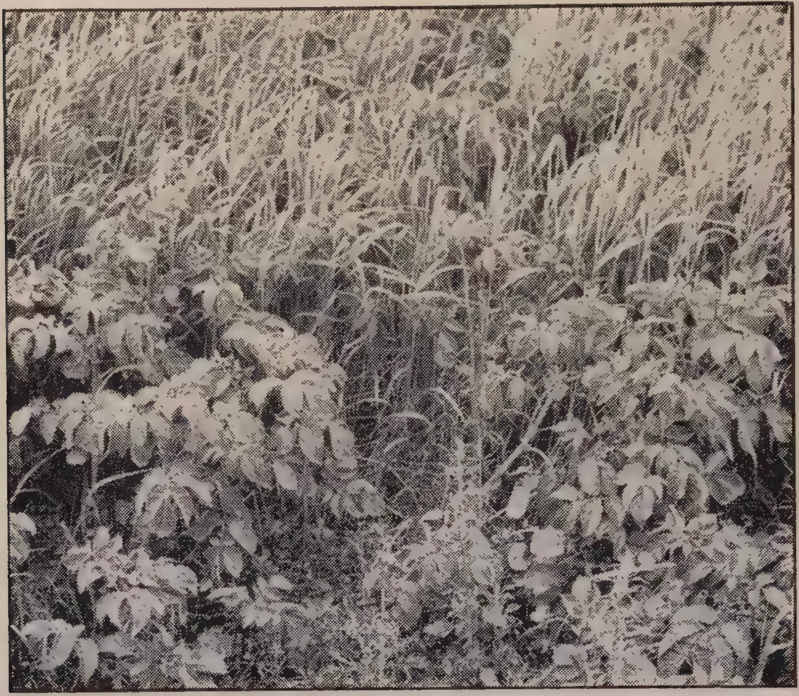
Matter for Individual Farmer

All this is very gratifying, because it cannot be too strongly emphasised that though the importance of farm production is fully recognised by the Government, which will continue to take every possible step to remove any obstacles to development that come within the scope of Governmental activity and to assist in increasing production wherever possible, increasing production is basically a matter for the individual farmer with the assistance of farmer organisations and producer boards.

In spite of one or two small clouds on the marketing horizon in the shape of substitute products for two of our major exports, I think we can look forward to the future with confidence. New Zealand's great natural advantages plus the high standard of skill attained by our farming community with the assistance of research and extension workers enable us to produce meat, wool, and dairy produce at a lower cost than any other country. I feel that the potential exists for making the necessary increases and that I can repeat with equal confidence in 1953 what I wrote in 1950 that there is little room for doubt as to the wisdom of investing money in land development.

K. J. HOLYOAKE, Minister of Agriculture

Promising Results in Couch Control Trials



A portion of the trial showing the almost complete control of couch in the treated area in the foreground compared with the dense growth in the untreated area behind.

COUCH or twitch (*Agropyron repens*) is a most difficult weed to control, particularly in wetter climates where a fallow is ineffective. Where couch grows in patches in paddocks cultivation of the entire area has to be modified if the weed is to be prevented from spreading. Restricting the spread of couch from fence-lines, drains, and the like also calls for special treatment, and the extra work involves both inconvenience and expense.

VARIOUS chemical methods of control have been tried in the past without success, but recent trials on the Taieri Plain have given very promising results. The chemical used, T.C.A. (sodium salt of trichloroacetic acid), is largely absorbed through the roots of grasses and is therefore most effective when applied to cultivated or ploughed ground. Other factors which influence the effectiveness of T.C.A. are soil texture, soil moisture and climatic conditions affecting growth at time of application, and subsequent rainfall.

In a trial laid down on peaty soil at Otokia in May 1952, T.C.A. at 20, 40, and 80lb. per acre was ineffective. Conditions, however, were unsatisfactory. Applications were made on uncultivated wheat stubble, the soil was dry, very little rain fell after treatment, and the couch was almost dormant when treated. Further trial work was carried out in the spring of 1952 and the best results were achieved on light-textured soil near Mosgiel, where conditions were almost ideal. Couch infestation was particularly heavy, the area having been ploughed, disced, and left the previous year. It was disced twice about a month before treatment.

On 3 October couch growth was vigorous, and when the area was deep ploughed the mat of couch roots extended the full depth of the furrow. T.C.A. at 25 and 50lb. per acre was applied immediately to the moist furrow and subsequent rainfall was sufficient to carry the weedicide well into the soil. The 25lb. per acre treatment gave only an estimated 60 per cent. control of the couch, but the accompanying photograph illustrates the almost complete control attained on the 50lb. per acre plot in the foreground compared with dense couch growth on the untreated area behind.

The potatoes on the treated area, ground keepers from a previous crop of the King Edward variety, made normal healthy growth, and it appears that an excellent crop of potatoes could follow spring application of T.C.A. The cultivation of the potato crop would also serve to eradicate any couch not killed by the weedicide, and in addition other weeds such as fat-hen, sowthistle, spurrey, and the host of other non-grassy weeds which appear to thrive when couch growth is reduced would also be controlled. As an alternative to this a heavy smother crop could be sown after treatment with T.C.A. As brassicas are not affected by pre-sowing applications of the weedicide, chou moellier drilled in appears to be an excellent crop for this purpose.

—*S. M. J. STOCKDILL,*
Fields Instructor,
Department of Agriculture,
Dunedin

Book Reviews

"Soil Restoration": Edward Faulkner

THIS book is the third on farming subjects by Edward Faulkner, the first, "Ploughman's Folly", arousing world-wide interest. There are quite a few farmers and gardeners who are enthusiastic followers of the "ploughless" method of farming.

"Soil Restoration" continues this topic and reports on the "experiment" which he has carried out to test his ideas. Unfortunately, however, the evidence he produces is far from convincing; the theories he puts forward to explain results he has observed are, on the other hand, remarkable for their ingenuity if not for their soundness. In "Soil Restoration" Faulkner develops an ever-recurring theme of "no artificials", but with a pitifully small amount of evidence in support of his ideas.

The book is dull and ill-informed. The author's style would appeal only to those who are enthusiastic supporters of his ideas. "Soil Restoration" could be dismissed as not worth considering but for the danger that Faulkner's condemnation of artificial fertilisers might cause some farmers to follow his example with results which could only be harmful to themselves and to their country.

It would be interesting to see the results Faulkner could achieve with ¼ acre of pumice country rather than his ¼ acre plot in Ohio which, in its neglected state before he commenced operations, carried a "growth of weeds and self-sown wheat that stood waist-high". Yet as far as can be judged the cumbersome structure of theories developed by Faulkner in "Soil Restoration" is built on his results on this ¼ acre of "somewhat richer soil" of Ohio. Faulkner says (p. 34) with reference to the work of experiment station staff members ". . . I brush aside their evidence as inadmissible." To return the compliment, I brush aside this book as not worth serious consideration.

Our copies from the publishers, Michael Joseph Ltd., and Oswald-Sealy (New Zealand) Ltd. 10s. 6d.

—*P.B.L.*

"The Countryman's Workshop": James Arnold. In the 14 chapters and 42 pages of line illustrations on ancient crafts of Britain there is much information that is likely to be of more interest to the hobbyist than to the practical man in New Zealand. The blacksmith and the saddler have disappeared from most country towns and chapters on their work may be useful to those still dependent on the horse as a work animal. One marvels at the persistence of some of the other individual crafts in this mass manufacturing age; there appeared to be little time for their practice in this country 100 years ago, and interest in them today can be largely only sentimental.

Phoenix House Ltd., London (A. H. and A. W. Reed). 10s. 6d.

HEADING PHOTOGRAPH: General view of the trial area, with the Two Thumbs Range in the background.

Package Bee Trials

THE possibility of the economic use of package bees from North Auckland to replace winter losses, strengthen weak colonies, and make spring increase has been a recurring topic among southern beekeepers for many years. Although a few small private shipments from the North Island to the South Island are reported to have been made from 1932 onward, no trials of any magnitude were undertaken until 1940, when the Department of Agriculture sponsored a shipment of 25 3lb. packages of bees from Whangarei. Honey crops from hives established with these packages compared quite well with those from overwintered hives, but no worthwhile trade in package bees appears to have developed. As the inevitable delay in transit and the extensive handling inseparable from available surface transport were considered to be possibly a major factor in the failure of trade to develop, a further trial using air transport was undertaken in 1952 by Department of Agriculture Apiary Instructors and interested beekeepers. In this article D. Roberts, Auckland, and I. W. Forster, Oamaru, Apiary Instructors of the Department of Agriculture, describe the various aspects of the trial and outline the conclusions reached.

SALE of package bees to apiarists in the northern and mid-western states of U.S.A. by beekeepers of the southern states, who are favoured by mild spring climates and plentiful early nectar sources, has long been a feature of American beekeeping. The development of a nation-wide interest in the value of honey bees as pollinators of important economic plants has caused a large demand for package bees for pollination and for honey production and the value of the trade in packages, pioneered by the late Mr. A. I. Root, now amounts to several million dollars annually.

New Zealand does not have the same extremes of climate as America, where severe winters in the north make it necessary, if the bees are to survive, to pack hives with heavy insulating material or store them underground in cellars. However, many New Zealand beekeepers have long appreciated the possibilities of development of a package bee trade between beekeepers in North Auckland, where the mild climate and ample spring nectar sources provide an early build-up of colony strength, and southern beekeepers, with acute wintering and spring-increase problems.

The obvious benefit to the southern beekeeper of using package bees is the saving of the large amount of high-grade honey which is normally used in sustaining his colonies over autumn, winter, and spring. Other advantages are that the working season is much shorter when package bees are operated, thus saving man-hours and the expense of extra trips to out-apiaries. Depreciation of hive equipment is reduced by having the equipment stored indoors instead of exposed to winter conditions. As package bees start with a young queen, the labour and expense of requeening overwintered colonies are avoided.

Earlier Trial

The Departmental trial in 1940-41 showed that if 3lb. packages of bees with young queens were shipped from Northland to the South Island and the bees were established in hives fitted with drawn combs containing some pollen and honey, the hive would build up rapidly to a colony strength great enough to enable the bees to produce crops comparable with those from colonies overwintered from the previous season.

At the time of the experiment air freight facilities in New Zealand were not readily available. Trial packages were sent by rail to Ranfurly, north Balclutha, and Gore, and were up to 3 days in transit. Some packages were not transferred until the day after receipt, the bees thus being confined for 5 days. No serious ill effects due to the lengthy confinement were observed, but unless conditions of temperature and ventilation are exceptionally favourable in a journey of this duration serious loss is likely.

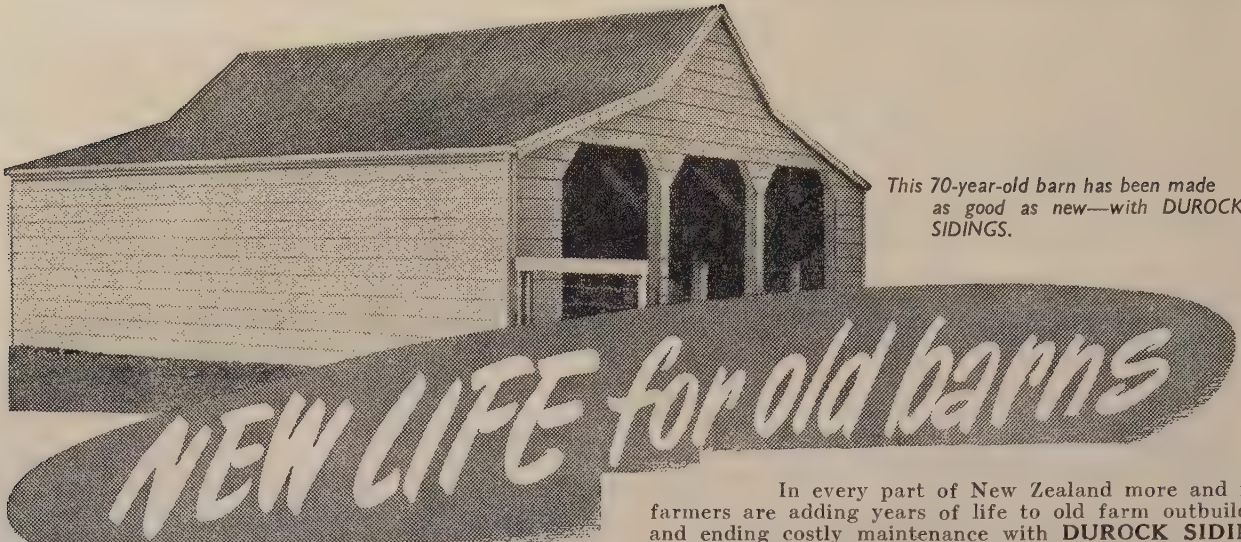
Owing to the uncertainty of surface transport and the unstable conditions caused by the Second World War dispatch of package bees was not proceeded with at that time.

1952-53 Trial

Final arrangements for the trial in 1952-53 were completed in October 1952, Messrs. W. I. Haines, Kaitaia, and G. B. Sharp, Matakana, co-operating in the preparation and supply of packages and bees and Mr. G. E. Gumbrell, Geraldine, in the operation of the test consignment in the South Island.

Five packages each were supplied by Messrs. Haines and Sharp, each package containing over 3lb. of young bees with a caged young queen accompanied by escort bees.

Two sites were selected for the test apiaries on the south-western side of the upper reaches of the Rangitata River. This area consists of fairly extensive river flats surrounded by steep hills carrying a considerable growth of tussock and snowgrass. The average altitude of the pasture land is about 1500ft. Rainfall is moderate and winters fairly severe. North-west winds are reported to be persistent,



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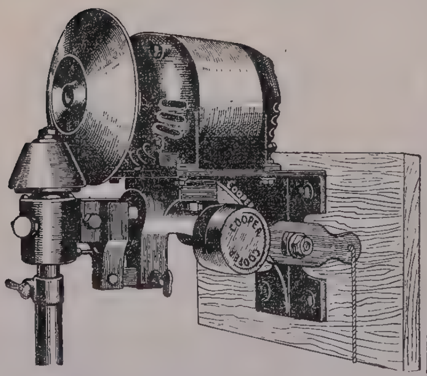

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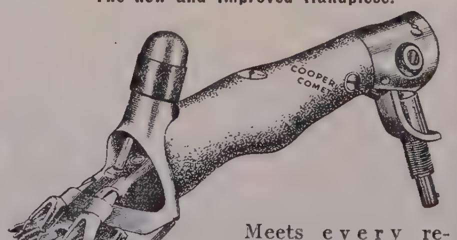

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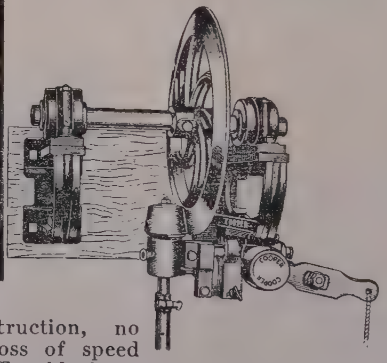

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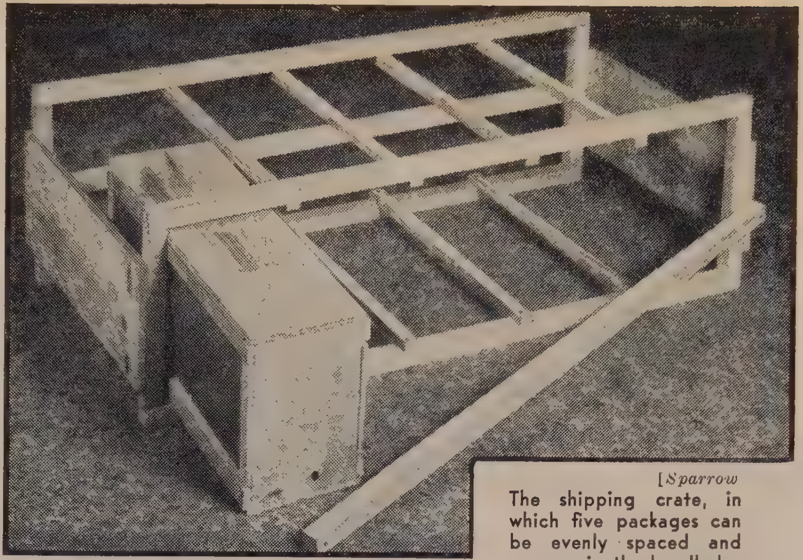
but these were not excessive during the trials. The main nectar-secreting flora are white and alsike clover, Canadian and Scotch thistles, catsear, and matagouri. Considerable *Lotus major* growth occurs on the marshy parts of the river flats, but the bees did not appear to work the abundant blooms of this plant. Presumably the wet soil conditions kept root temperatures too low for nectar secretion.



[*Sparrow*

The shipping crate, in which five packages can be evenly spaced and conveniently handled.

Transport

It is essential when package bees are being transported that temperatures of greater than 80 degrees F. should be avoided; otherwise excessive activity will generate further heat which may destroy the package within an hour or less. Disturbance caused through excessive handling at transhipment points may also cause nervous and excited bees to generate heat, with consequent danger of suffocation. Exposure to the direct rays of the sun will have similar effects on caged bees, and where numbers of packages are stacked together in sunlight for more than a few minutes overheating will quickly occur.

United States experience showed air transport to be the most suitable and it is used in that country whenever freight rates are economic. Generally high rates, however, cause shippers and buyers to prefer motor transport, and journeys by truck and trailer of more than 1000 miles are commonplace.

New Zealand's topography is such that the rapid movement necessary for the continued successful shipment of package bees between the North Island and the South Island cannot be provided by surface transport.

Air freight offers very rapid transport with a minimum of handling. In addition, owing to the cool temperatures during flight, there is little risk of overheating. Package bees can withstand quite cool temperatures and will travel much more satisfactorily at temperatures of 70 degrees F. or less than they will in warmer temperatures. Consideration of these factors decided the use of air transport for the trial.

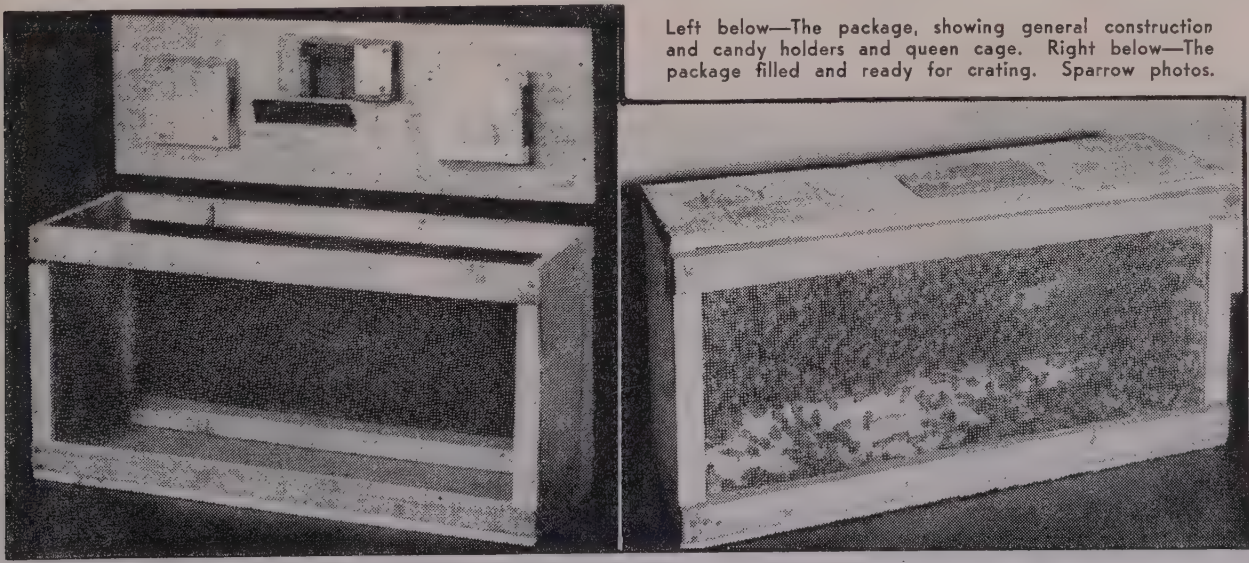
Air transport allowed delivery to be made thus: Mr. Haines's packages were caged during the afternoon of 27 October and dispatched by air from Kaitaia at 1.55 p.m. on 28 October. Mr. Sharp's packages were caged late on the morning of 28 October and forwarded from Whenuapai airport (Auckland) at 4 p.m. the same afternoon. Both consignments were delivered to the Christchurch airport at 8 p.m. the same day.

The time taken in transit from point of dispatch to the Christchurch airport was 6 hours for the Kaitaia consignment and 4 hours for that from Whenuapai. Air distances were 700 and 500 miles respectively and the periods of confinement were 50 hours for the Kaitaia packages and 32 hours for those from Matakana.

Construction of Cages

Because the rates for air freight are fixed on a per pound basis, with a strict limitation on the size of individual parcels, close attention was paid to the construction of cages and crates in an endeavour to reduce weight and dimensions to the minimum consistent with strength and safety. Particular care was exercised in the construction of the cages to ensure that there would be no escape of bees in normal circumstances.

All package cages were of wire gauze with wooden tops and bottoms and with strips of thin wood tacked over all edges of the gauze. Cages were constructed by Messrs. Haines and Sharp and dimensions were approximately 16¼in. x 8¾in. x 5½in. Cage weights varied with the timber used, Mr. Haines's cages averaging



Left below—The package, showing general construction and candy holders and queen cage. Right below—The package filled and ready for crating. Sparrow photos.

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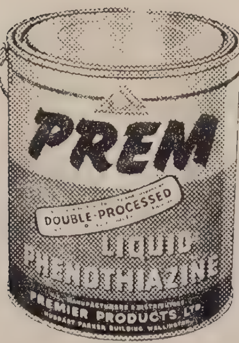

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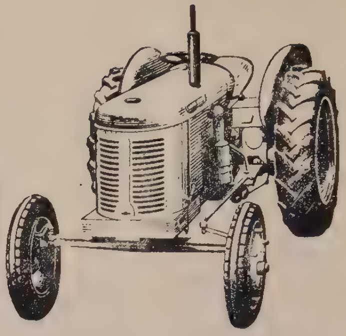

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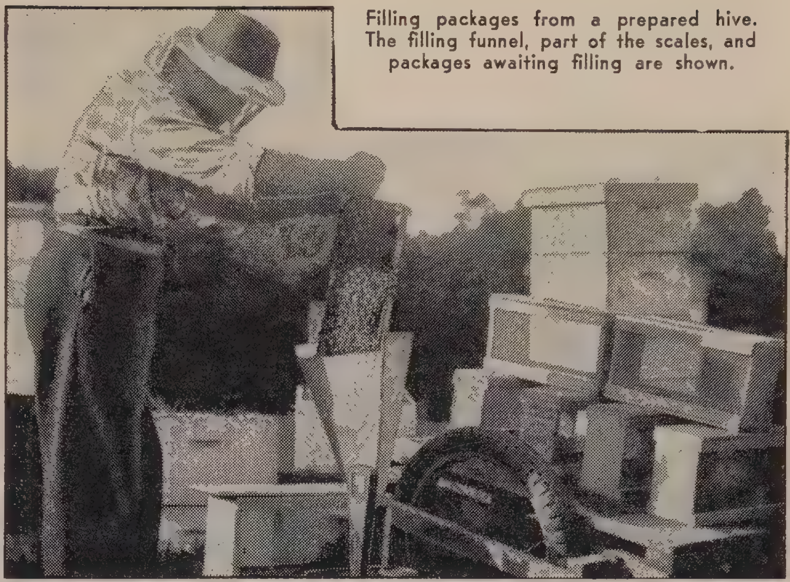

Filling packages from a prepared hive. The filling funnel, part of the scales, and packages awaiting filling are shown.

3lb. 9oz. empty and Mr. Sharp's, made of a lighter timber, 2lb. 11oz. Both types travelled equally well. Some of the cages were provided with a slot in the lid to hold the queen cage, some had a further opening covered with perforated metal to provide additional ventilation, and others had solid lids. The inner side of each lid was provided with two shelves to hold candy for feed. For transport, framework crates of 2in. x 1in. wood were constructed.

To provide comparative data of ventilation requirements one crate was built to give a 4in. to 5in. spacing of packages and the other 1½in. to 2in. As all packages arrived in excellent condition, it would seem that the ventilation provided in the more compact crate with the 1½in. to 2in. spacing was adequate.

The lighter cages, the Matakana shipment, showed no evidence of damage or strain and this design should be suitable for air transport. The more compact crate size possible with the smaller spacing of 1½in. to 2in. was considered to be much more suitable for storage in aircraft and in addition provided a saving of some pounds in the weight of the crate. Experience may provide information which will lead to further small reductions in the weight of cages and crates, but the paramount necessity for security in air transport cannot be outweighed by consideration of reduced freight costs.

As the cages cost about 3s. each, their return by parcel post would be economic, giving a saving of about 2s. per package. Prices for the supply of package bees are usually based on this system of returning containers.

Filling the Bees into Packages

To ensure that all packages were drawn from healthy stock 10 hives in an apiary of each of the suppliers were numbered and carefully examined for visible signs of disease. In addition, specimen bees from each selected hive were sent to the Department of Agriculture's Animal Research Station, Wallaceville, for examination for the presence of *Nosema apis* and other bee diseases. All samples returned negative results.

As it was desirable to use only newly hatched bees (up to 12 days of age) for the trials, the selected hives were prepared in the following manner:—

The day before the packages were to be filled the hives were examined and all brood more than a few days old was lifted into the second hive body. All bees in the second and third hive bodies were then shaken in front of the hive, a queen excluder was placed over the lower body, and the other bodies were replaced. With the hives in this condition the majority of the young bees were found clustered on the brood in the second chamber. By filling the packages during the warm part of the day, when the flight from the hive was at a maximum, and by taking only those bees clustered on the brood above the excluder, the inclusion of drones and many worker bees of more than the desired age was avoided.

When the packages were being filled bees from the brood combs of the prepared hives were shaken or brushed directly into a large funnel which fitted into an opening in the lid of the cage. During filling the cages were stood on a platform scales which was compensated for the weight of the cage and funnel. When the cages were filled the funnel was withdrawn, the queen cage with the queen and escort bees inserted and fastened, and the lid nailed down. The packages with the perforated ventilation pieces in the lids were filled through these openings, the queen cages being inserted previously.

Queens

Queens used for the trial packages were those from the hives from which the packages were drawn. Five were early spring rearings and five were overwintered rearings of the previous autumn. Half of the 10 queen cages supplied were fitted with guards over the candy-filled entrances, the balance being unguarded. Queens from the unguarded cages were released in transit with no apparent ill effects. Others were not released until 2 days after installation on the hives. All queens were accepted. The release of queens in transit, if acceptable to buyers, would give such packages an advantage of several days' brood rearing over those where the queen is not released until after establishment.

Food Required for Journey

Because bees are unable to exist for more than a very short period without food, all packages were supplied with varying quantities of queen cage candy, a mixture of honey and powdered sugar. To establish the minimum quantity of candy necessary to maintain the bees in transit packages were supplied with amounts varying from 4 to 7oz. each. All candy was stored in the shelves in the undersides of the lids, where it would be immediately above the cluster of bees.

The following table shows the period of confinement and the amount of candy supplied to and the consumption of each package:—

Package no.	Period of confinement	Amount of candy supplied	Candy consumed
	hours	oz.	oz.
1	50	5	5 (all)
2	50	7	5
3	50	7	6½
4	50	4	4 (all)
5	50	4	4 (all)
6	32	5	3
7	32	5	2
8	32	5	3
9	32	4	3
10	32	4	2½

Minimum requirements appear to be 1oz. of candy every 24 hours for every pound of bees. Thus a 3lb. package expected to be confined for 48 hours would need to be furnished with not less than 6oz. of candy.

Reduction of Bee Weight during Transit

Because it was anticipated that some loss of bee weight would occur in transit, packages when filled were given overweight allowances varying from ½oz. to 1lb. 2oz. The average over-all weight of the bees in packages at dispatch was 3lb. 6oz. Weights were carefully checked before the packages were installed and loss of weight was found to vary from 2 to 15oz. The over-all average loss was approximately 5½oz. or 10 per cent. of shipped weight. This is in accordance with experience overseas, where it is the practice of reputable suppliers of package bees to include an overweight allowance of up to 20 per cent. at dispatch.

Collection and Installation

When collected from the aeroplane at Christchurch the packages of bees did not appear to be unduly distressed or over-heated and within an hour were completely settled down. It had been considered that it would be necessary to give the bees water to quieten them, but this was not required.

Next day the packages were conveyed to the test sites and after being weighed were installed in hives in the late afternoon.

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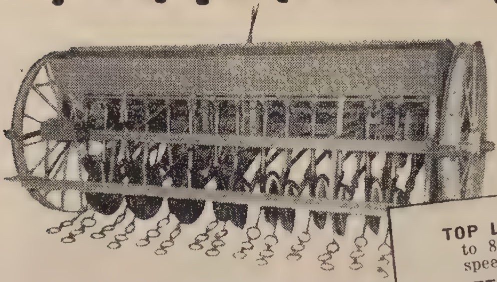

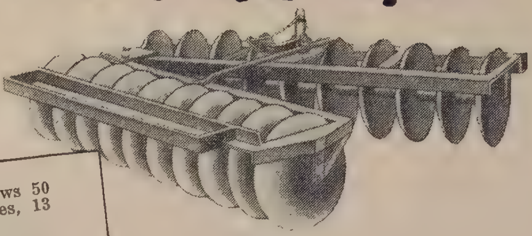

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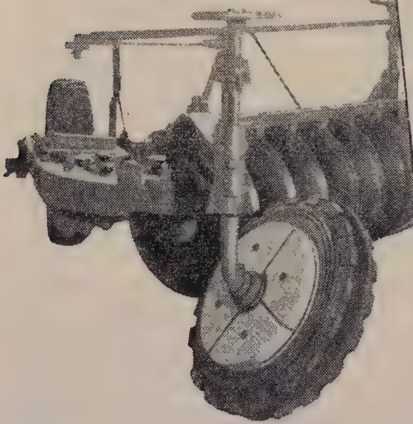

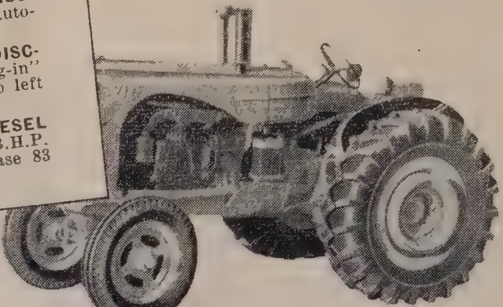

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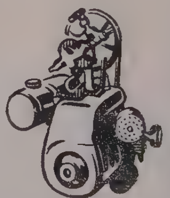

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Preparing to install package bees.

The 10 hives with drawn combs containing the equivalent of one full comb of pollen and 15lb. of feed honey per hive were set up on the respective sites. An empty super was placed either beneath or on the top of each hive to house the package. To prevent the bees rushing from the hives immediately they were released the hive entrances were lightly blocked with green grass. This grass had wilted sufficiently by next morning to be easily pushed aside by the bees seeking egress. Syrup of half sugar and half water was brushed on to the wire-gauze sides of the cages some 10 minutes before the bees were installed. However, as the bees showed a tendency to fly out when the tops were prised from the packages, it was found necessary to splash water into the cages and dump the bees down several times to wet them to an extent which prevented their taking wing.

After the tops of the packages had been removed the queen cages in which the queens were still captive had the candy guards removed and were then placed between the combs as close as possible to where the bees in the package were to be. The packages with lids removed were placed either right way up in an empty super beneath the combs or upside down in an empty super above.

This method of installation was entirely satisfactory, but it would perhaps be more convenient if the bees, suitably wetted with syrup or water to prevent flying, could be dumped from the package on to the combs. This would save the return trip to collect the empty cages. Wetting of the bees should be done with caution, especially if the night is likely to be cold. If the installing were done in the evening, very little moisture would be required to control the bees.

At the test apiaries 2 days after the packages were installed the bees were found satisfactorily established on the combs. About 20 dead bees were found in front of each hive, which would represent only the ordinary death-rate of a colony. The five queens that had been released from the cages during transit were laying. A pencil was pushed through the candy in the other cages to hasten the release of the queens in them.

No other variation of condition was discernible according to type of cage, method of crating, or installation procedure.

As no established hives were present in the area, there was no danger of the package bees being robbed before they were sufficiently organised to defend themselves. It would be necessary to guard against this danger when package bees were installed in established apiaries.

Operation of Test Apiaries

On 25 November three nucleus colonies, each having three frames of brood, were placed on the sites to act as checks and from then on both packages and check hives were given ordinary apiary management. The queens were clipped on 25 November and excluded down to the bottom box on 23 December. Drawn combs were used throughout the trial and the hives were stripped of all honey on 17 February. The full supers from each hive were weighed as were the empty supers and combs after extraction to allow the net weight of honey to be computed.

The following summary shows the main factors in the performance of the test and check hives.

	Package bee test hives	Check hives
29/10/52	Installed in hives	
25/11/52	Averaged 6 frames of brood	Averaged 3 frames of brood
23/12/52	Averaged 10 frames of brood	Averaged 6 frames of brood
17/2/53	Average crop 106lb.	Average crop 76lb.

When the main honey flow began in the second week in January, about 10 weeks after the packages were installed, the test hives were well up to full strength. This build-up rate is similar to the experience of American beekeepers.

The five hives whose queens were released during transit started well with an initial advantage of two frames of brood per hive over the hives whose queens were still confined on arrival. Although this lead was maintained throughout the build-up period, these more forward hives produced no more honey and this may indicate that packages could well be established a little later than 10 weeks before the honey flow or that a smaller package of, say, 2lb. of bees would give equally good results. The comparatively good performance of the weaker check hives also suggests this. Further investigations of this aspect are required.

At intervals during the season 4 of the 10 package bee hives became queenless. This seriously affected honey production. Queen losses in colonies started from packages is a recognised problem in America, but such losses usually occur within the first few weeks as a result of supersedure. The sporadic incidence of queenlessness in the test hives would suggest some other factor as being the cause. All 4 hives that became queenless were at one apiary, where the only noticeable feature was that the site was on the lee side of a ridge surrounded by a dense growth of matagouri which tended to create very hot conditions in the apiary.

The build-up of package bee colonies could be considerably aided by the addition of a comb or two of brood from established hives. Such a practice would also be beneficial in restoring the balance of age groups of the bees and should mitigate any tendency that packages may have toward queen supersedure.

No difference was noticeable in the performance of the 5 spring-reared queens as opposed to that of the 5 autumn queens.

Pollen

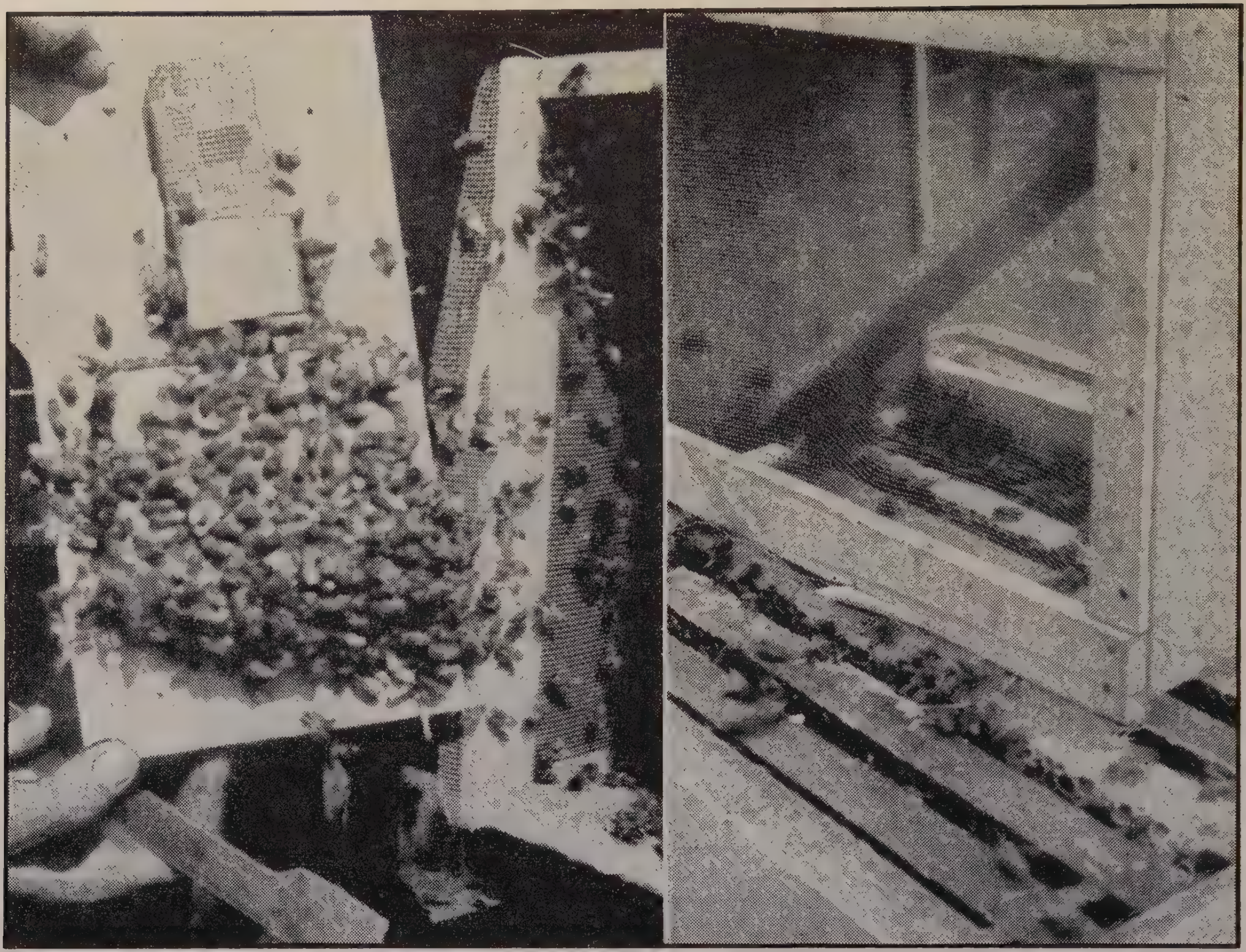
As pollen provides practically the entire protein requirements of the honey bee colony, an ample supply of this is essential for normal brood-rearing activities. When pollen is in short supply the nurse bees preparing brood food must draw on reserves of protein stored in their own systems to their bodily detriment. Thus a shortage of pollen causes a weakening of the adult bee strength of the colony as well as reduced brood rearing.

Such a condition is serious in a colony of bees under normal circumstances, but to a package colony depending on a quick build-up from a standing start any curtailment of brood rearing or weakening of the adult bee force would be disastrous.

It was noticeable how the entire comb of pollen given to each installed package was used in raising the first brood cycle. The furnishing of ample pollen is undoubtedly an important factor in the operation of package bees, particularly if the food used is sugar syrup. Should natural pollen not be available, it would be necessary to feed a pollen supplement. Particulars of feeding these supplements are obtainable from Apiary Instructors of the Department of Agriculture.

Combs

The fact that drawn combs were used greatly facilitated the installation and build-up of the test colonies. The



Left—A top removed from a package before installation, showing bees clustered on candy. Right—Bees established on combs 2 days after being installed from a package into an empty super.

initial progress of package bee colonies would be precarious and very slow if they were required to establish themselves on foundation only.

Economy

The costs of landing each package at Christchurch were as follows:—

	£	s.	d.
3lb. of package bees and young queen delivered to aeroplane	1	6	6
Air freight to Christchurch on gross weight—8lb. at 1s. 1d. per lb. from Kaitaia		8	8

To which must be added all costs thereafter, including:—

Collecting and installation of bees.

Honey or sugar for early feeding (approximately 15lb.).

Apiary management, transport, and extraction of crop.

Interest on value of hive equipment used and outlay on bees, etc.

Depreciation and maintenance of hive equipment.

These costs would vary according to the distance travelled to pick up packages and the distance of the apiary in which they are established from the beekeeper's residence.

The package bees under trial last season were established 40 miles from the beekeeper's residence and were started off on combs of honey. They averaged a total production of 106lb. of honey and beeswax last season.

Utilisation of Package Bees

It would appear from the results of this trial that package bees could be economically used in the following ways:—

1. They could be operated for one season only; the bees could then be gassed, all honey extracted, and the equipment stored until the next season.

2. They could be used to make permanent increase in colony numbers.

3. They could replace winter losses.

4. A set number of colonies could be united at the beginning of the honey flow to give a strong gathering force and replaced the next season with packages.

5. Packages could be united to weak hives to boost their strength before the honey flow.

Any practice adopted for the use of package bees would need to be applied fairly consistently, as the venders of packages would need to be assured of a reasonably steady trade with firm orders well in advance; otherwise they could not organise their businesses for this trade with any confidence. The buyer on the other hand would need to have delivery guaranteed by a set date.

Results of Test

Results of the test indicate that:—

1. Package bees from the far north can be economically brought south and operated for honey production.

2. Air freight provides a very suitable means of transport.

3. Delivery 10 weeks before the honey flow gives ample time for normal build-up.

4. Pollen is an essential requisite in establishing package bees.

5. Package bees could be successfully operated only by skilled beekeepers with the necessary food, combs, and equipment.

Preserving Eggs from Household Poultry for Winter Use

EGG production varies with the period of the year and household poultry keepers who keep a record of eggs laid by their birds will have noticed that production gradually increases during the latter part of July and rises to a maximum in September and October. This is what is commonly referred to as the flush season, and many householders with small numbers of birds are getting more eggs in a week than can be conveniently consumed by the family, but 6 months from now these birds will probably be laying insufficient eggs for total household requirements. During September and October, therefore, the household poultry keeper should preserve eggs for late autumn and winter, when production is lower and egg prices reach their peak. The task is not difficult and does not involve any heavy costs. Furthermore the household poultry keeper is most favourably placed in that fresh eggs, only a matter of hours in age, can be preserved—a most important aspect of satisfactory egg preservation. In this article the Animal Industry Division describes the class of egg required for preserving and methods of preserving.

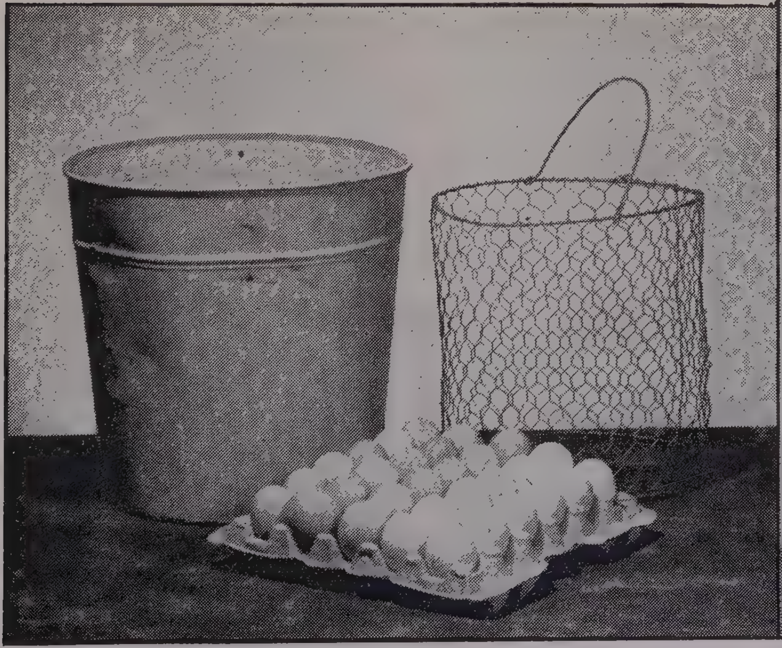
THE subject of preserving can be conveniently divided under two headings—the class of egg required and methods of preserving.

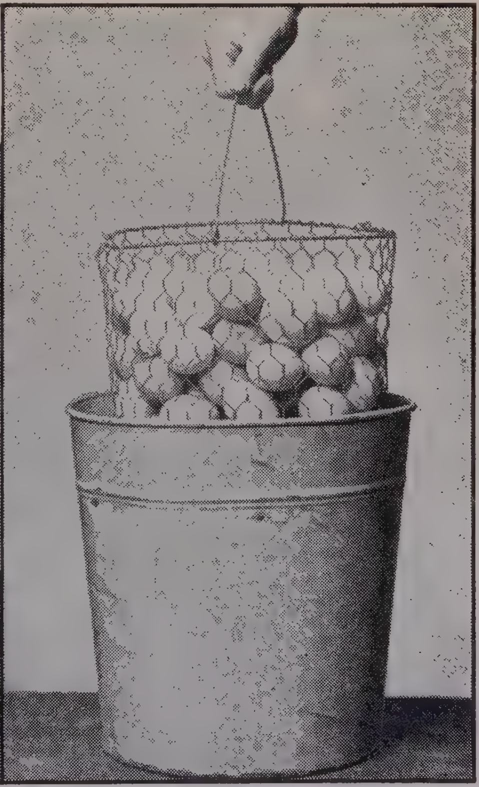
Good-quality eggs suitable for preserving.

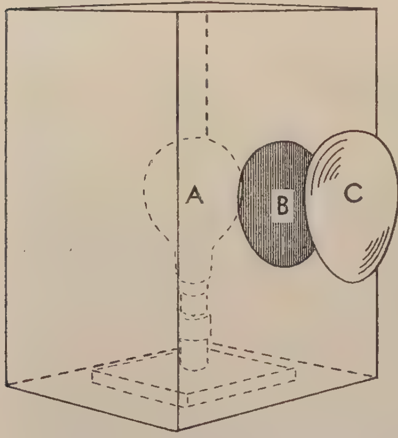
Class of Egg Required

As has already been indicated, the first essential for good preservation is that the eggs must be fresh. This presents no difficulty to the household poultry keeper, who can put eggs into preservative daily after collection from the poultry shed. Such eggs, however, should be cooled before being placed in preservative. Eggs are often warm when collected from the nestbox, particularly at this time of the year, if heavy breed or crossbreed birds are kept and a bird is occasionally broody. Such a bird will sit all day on a nest where there are eggs. It is desirable to preserve clean-shelled eggs only and not cleaned ones, particularly dirty or stained eggs which have been washed in water. The shells of the eggs chosen should be sound throughout and preferably not rough at the large end, as such shells are usually poor and porous at the large end. Eggs with fine or hair cracks should not be used for preserving. These fine cracks are most diffi-

Preservation of eggs. Below—Equipment required. A wire basket 10in. in diameter and 10in. high holds just over 10 dozen eggs. At right—Method of using the equipment. Fraser Niederer photos.







A simple method of candling eggs.
A—Light. B—Aperture. C—Egg.

cult to see, but if two eggs (one in each hand) are gently tapped together, from the sound produced it is possible to detect the cracked egg. Uncracked eggs give a clear, metallic "chink", whereas when there is a cracked egg the sound is duller and has a cracked character. Size and shape of egg are immaterial, provided the shells are sound, and colour is of no importance.

It is unpleasant and unappetising to break open an egg—whether fresh or preserved—to find a blood spot or other discoloration of the contents. Thus, before eggs are preserved it is sound practice to candle them. This is done by placing the egg before an opening of the appropriate size in a piece of wood or cardboard behind which is an electric bulb. This lights up the contents of the egg. For obvious reasons it is easier to candle eggs in darkness or in a subdued light. When an egg is being held before the light it should be rotated sharply so that the yolk inside is moved, and small black spots or specks which move as the egg is rotated should be watched for. These black spots are blood spots. In a fresh egg the yolk appears as an oval shadow only, and is more easily seen when the egg is twisted sharply than when it is stationary before the candling lamp. Should the yolk be dark and well defined, it is probable that it is either very dark (deep orange) or discoloured (greenish). To avoid disappointment later it is wiser to use such eggs after they have been candled instead of putting them into the preservative. A suspected egg can be broken into a cup or saucer before use to ascertain whether or not the dark yolk is normal.

When candling is being done it is possible to detect cracks in the shell, however fine they may be, and to note the general soundness of the texture of the shell.

A final condition, of considerable importance, is that for preserving it is desirable to use infertile eggs, that is, eggs from birds which have not been mated with a male bird. The warmer the weather is the more important this becomes. A fertile egg contains a germ which in warm weather or if the egg is left under a broody hen all day starts to develop. Later it will die and in some cases will start deterioration in a preserved egg.

Methods of Preserving

The principle of preserving eggs is to seal up the pores of the shell to exclude all air and undesirable organisms which could cause the contents of the egg to break down. Perhaps the oldest and most popular method of preserving eggs is by the use of a waterglass solution. Proprietary products of this kind are easily obtainable and are invariably accompanied with full directions for use. Earthenware crocks, tins, or galvanised buckets may be used for storing eggs in waterglass; the vessel should have preferably a wide opening so that eggs may be placed in and removed from the liquid with ease. The use of a wire basket which fits into the storage utensil as shown in the illustration at the bottom of the previous page assists in the removal of eggs. It is not wise to use an unusually deep vessel, as the pressure on the bottom layers of eggs may cause cracked eggs, which will be completely spoilt by the preserving liquid. When eggs are preserved by the waterglass method a cover should always be placed on the vessel to reduce evaporation of the liquid to a minimum. The eggs should be stored in a cool place.

Eggs preserved in waterglass should be used chiefly for cooking, as when they are boiled the shells are liable to burst.

Another preserving product offered for sale is a semi-solid substance similar to petroleum jelly for smearing over the surface of egg shells. This prevents air entering the shell and also stops all evaporation of the contents of the egg. Obviously treating eggs in this manner is more tedious and takes more time than placing eggs in a liquid. It is, however, a satisfactory method for handling small numbers of eggs. Care should be taken to store eggs so treated in a cool place where there is a minimum change of temperature, as temperature changes will affect this type of preserved egg more quickly than those preserved in liquid in a covered vessel.

Strong Smells Taint Eggs

An important fact sometimes overlooked by householders is that eggs will readily absorb strong smells such as those from kerosene, fish, and even oranges. Eggs are similar to milk in this respect. Therefore, if eggs are held in the house for a few days before they are preserved, it is essential to keep them away from any strong odours. Unless care is taken in this, the eggs may have a pronounced flavour when they are taken out of the preserving material, which may be blamed erroneously for a strong flavour in the egg.

Generally it is not recommended that duck eggs be preserved by the methods described.

Book Review

"Development of Agricultural Education in New Zealand": L. J. Wild

THE whole subject of agricultural education has come to the fore once again, and it is particularly opportune that while discussions are in progress a penetrating study of the development of higher education in agriculture should be published. Mr. Wild is well qualified to undertake this task, his short book being based on the Macmillan Brown lectures which he delivered in Christchurch last year. The Canterbury pioneers showed foresight and energy in establishing Canterbury Agricultural College; unfortunately the college was not able for many years to exert that influence on the country's farming that its founders had desired. One problem which faced its founders and is still unresolved is whether the college should concentrate its energies on training agricultural scientists or on giving practical farmers a scientific background. Today the problem has become one of reconciling the growing need for greater specialisation with the need for a training, especially for extension work, which enables a man to see a farm as a whole. Mr. Wild is not sparing in criticism, and the parochial rivalries which have beset higher education in New Zealand from the beginning are ironically described. He concludes by drawing attention to some of the questions, not by any means new, that will demand more attention in future—education in veterinary science and in forestry. Past experience should at least afford some guidance here.

—*P.R.S.*

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EDITOR: P. MACKINTOSH
THE JOURNAL OF THE BRITISH GRASSLAND SOCIETY
This Journal is a medium for the publication of the results of research and practical experience in the realm of Grassland Husbandry.
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1. The Possibilities of Grassland Today. Martin Jones.
2. Trends in Grassland Research with Special Reference to Conservation. S. J. Watson.
3. Some Comments on Papers Read at the Sixth International Grassland Congress. T. E. Williams.
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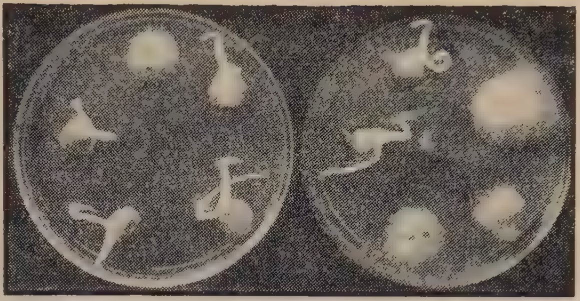
Disinfection of Vegetable Seeds

VEGETABLE seeds of high germination capacity may fail to give good stands of seedlings even when sown under ideal conditions of soil moisture, aeration, and temperature. Poor results under such conditions are usually due to the seeds or seedlings being attacked by harmful fungi, bacteria, insects, and nematodes (eelworm) which may be carried on the seed coats (seed-carried organisms) or by pathogenic organisms embedded in seed tissues (seed-borne organisms). In addition to seed-carried and seed-borne organisms there are a number of harmful organisms in nearly all soils which are responsible for rotting of seeds, damping off, seedling blights, or root rots. Special cases of failure of seeds to germinate owing to dormancy are not considered in this article by H. Jacks, Senior Plant Pathologist, Plant Diseases Division, Department of Scientific and Industrial Research, Auckland, in which the most effective methods of disinfecting vegetable seeds are described.



[H. Tooley

Fig. 1—*Pythium* infection of pea seeds lifted from soil 2 days after being sown.

FAILURE of seeds to germinate or of seedlings to emerge, commonly known as pre-emergence damping off, is due to:—

Soil-borne organisms (fungi (Fig. 1), bacteria, and insects) causing rotting of seeds or death of seedlings before emergence.

Seed-carried organisms (fungi or bacteria) causing rotting of seeds in storage or after planting (Fig. 2).

Seed-borne organisms (fungi, bacteria, or weevils) causing failure of seeds to germinate and diseases of plants grown from infected seed.

Seedling stands are often thinned by attacks of soil fungi or bacteria on the roots and portions of the stems below or immediately above soil level. Wilting and death of seedlings after emergence are commonly known as post-emergence damping-off.

Seed Treatments

Seed treatments are designed to:—

1. Prevent pre-emergence damping off through destruction of seed-carried organisms by therapeutant dust or slurry treatments.
2. Prevent post-emergence damping off, to some extent, by bringing about increased vigour of seedlings.
3. Destroy seed-borne organisms by hot water treatment or by chemical steeps.
4. Destroy virus or bacterial infection by special methods of seed extraction.
5. Destroy eelworm and weevil infestation by fumigation of seeds.

Vegetable seed treatment is especially important in the control of damping off. Treatment protects the seeds and young seedlings from attack and improves the stand, yield, and quality of plants and plant produce (Fig. 3). Although not highly effective for control of seed-borne diseases such as seedling blight of peas, treatment reduces the incidence of such diseases. Seed treatments are usually effective against organisms attacking seeds in the early stages of seedling development; in some cases, however, they will protect seedlings in the stage of aerial growth.

Some materials are more effective against certain organisms than others.

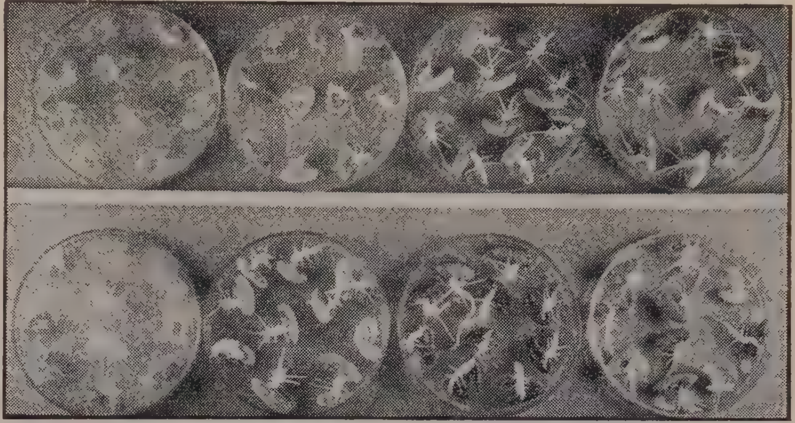


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Fig. 2—Effect of some seed disinfectants on seed-carried organisms of french beans. The plate at upper left contains untreated seeds.

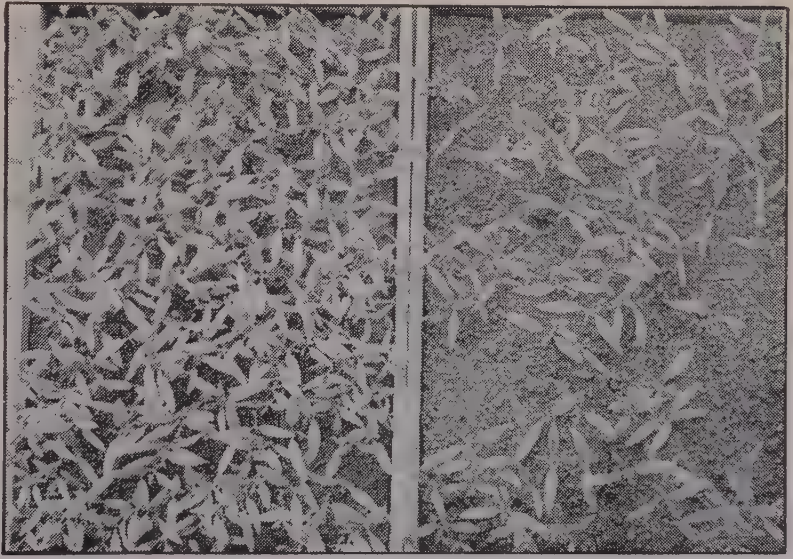

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Fig. 3—Tomato seedlings from treated seeds (left) and untreated seeds (right).

For example, quinones ("Spergon" and "Phygon") are more effective against bacteria than are other materials. Some seeds such as peas, french beans, and spinach, give better response to treatment than others (brassicas, radish, etc.). Materials and processes used in seed disinfection vary with the seeds to be treated and the organisms to be controlled; for example, beet seed is adversely affected by quinones, and the application of insecticides by the slurry method is more effective against wireworm than is the application of dusts.

Treatments are selected to give satisfactory control of harmful organisms without causing reduction of germination or damage to seedlings. Seed treatments recommended for use with vegetable seeds are described in Table 1.

Soil conditions have an important effect on the susceptibility of seeds and seedlings to disease. With high temperatures and moderate soil moisture giving rapid germination and strong seedling growth, use of untreated seeds is often satisfactory. When cold and wet soil conditions delay germination of seeds and emergence of seedlings, thus prolonging the period during which pathogenic organisms can attack the seeds, seed treatment is essential. Under unfavourable conditions the strong, healthy plants produced from treated seeds are usually less subject to post-emergence attack than less vigorous plants grown from untreated seeds.

Seed disinfectants are inexpensive and easy to apply and should normally be used on all seeds, as they provide an economical method of protection against pre-emergence losses and in certain cases eliminate diseases attacking mature plants.

The various methods used in seed disinfection are dusting, slurry treatment, hot water treatment, and special treatments.

Dusting

Seed dusts contain active ingredients (fungicides or insecticides), fillers (china clay, talc, etc.), which ensure even distribution of the active ingredients, and sticking agents, which ensure adhesion of dusts to seeds.

The fineness of dusts may affect the amount adhering to seeds (often specified as load or cover) and thus their efficiency in seed protection. The finer the particles are the better the coverage of seeds with therapeutant and the easier the flow of seeds through drills. The nature of the chemicals and of the fillers used may affect the passage of seeds through drilling machines, where excessive friction may cause clogging. Materials used must therefore be of a nature which will not affect the smooth flow of seeds through the drills.

Some dusts increase friction between seeds in drills, thus causing clogging with subsequent gaps in seed rows. To reduce friction it is advisable to add graphite to these dusts, as this material ensures smooth flowing of seeds through the drills. The normal amount of graphite applied to 100lb. of seed is 1 to 3oz.

Quantities of dust applied to seeds are measured in relation to weight and are defined as percentages of seed weight. Dosages vary with the seeds to which the dusts are applied, with the specific formulations of chemicals

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Above: Fig. 4—An operator wearing a protective mask during seed treatment. Below: Fig. 5—Left: A weighed amount of seeds and disinfectant (black patch in centre) which are shaken in a flask for 5 minutes to obtain adequate coverage of the seeds. Right: Sufficient dust to cover $\frac{1}{4}$in. of the tip of a pen-knife blade is required to treat the seeds in a small packet.

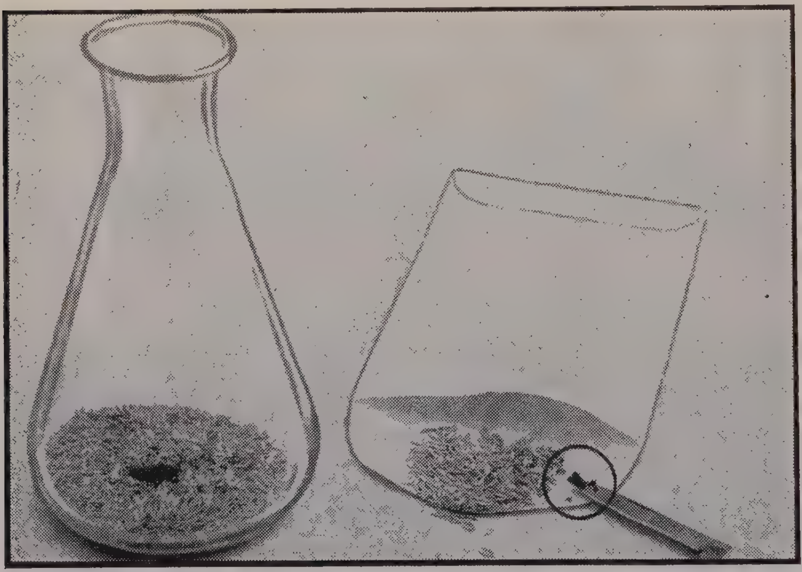
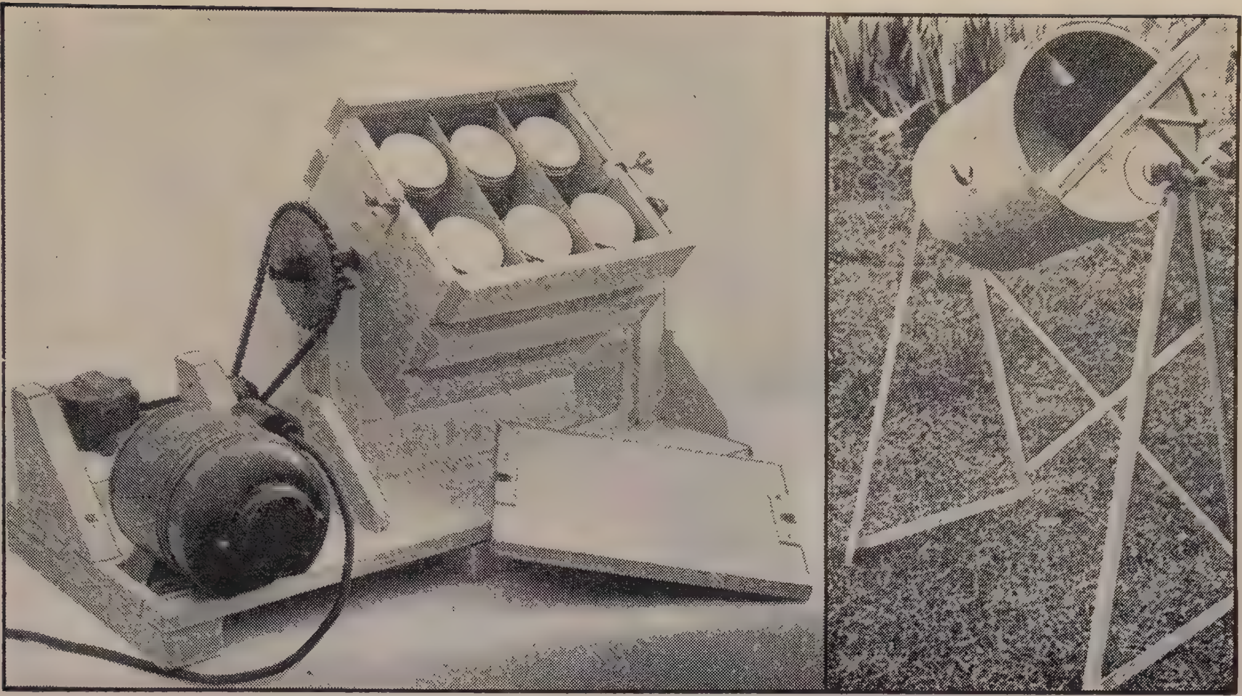


TABLE 1—DESCRIPTION OF MATERIALS RECOMMENDED FOR SEED TREATMENT

Chemical	Trade name	Percentage active ingredients	Description	
			Colour	Whether wettable or not
D.D.T. (dichloro diphenyl trichloroethane)	"D-spray 50"	50 para para isomer	white	yes
	"Pespruf 50"	50 para para isomer	grey	yes
Ferbam (ferric dimethyl dithiocarbamate)	"Ferbam"*	98	black	no
	"Fermspray"	70	black	yes
Thiram (tetramethyl thiuram disulphide)	"Thiram"*	98	grey	no
	"Tetram"*	98	grey	no
	"Fernasan"*	50	grey	no
	"Premasan"*	50	white	no
	"Thirodust"*	75	grey	no
	"Thirospray"*	50	grey	yes
Gamma B.H.C. (lindane) 99 to 100 per cent. gamma isomer of B.H.C.	"Lindane 25"	25	white	yes
	"Nexa"	16	grey	yes
Dichloro naphthoquinone	"Phygon"	98	yellow	no
	"Phygon XL"	50	yellow	yes
Tetrachloro para benzoquinone	"Spergon"	98	yellow	no
	"Spergon W."	95	yellow	yes
	"Tetroc"	98	yellow	no

* To improve passage through drills it is advisable to add 2oz. of graphite to each 100lb. of seeds treated with this material.



[Department of Scientific and Industrial Research

Figs. 6 and 7—Seed-dusting machines. Left—Fig. 6: A machine for dusting small quantities of seeds. Right—Fig. 7: A hand-operated, intermittent-action seed-dusting machine for treating moderate quantities of seeds.

in the dusts, with the method of application, and with the disease to be controlled. The inclusion of sticking agents in formulations of dusts or wettable powders ensures effective coverage of seeds. Small seeds require higher dosages than large ones, as the smaller is the seed the greater is the surface area for a given weight.

Where the quantities of dust required exceed those that will adhere naturally to seeds it is necessary to use sticking agents. This applies particularly to treatment of onion seed for smut control, for which higher dosages are required to protect seedlings from soil-borne infection. Stickers such as methyl cellulose, which is sold under various trade names like "Cellacol", "Cellofas", "Methocel", and "Tylose", are satisfactory and are safe to apply. It is not advisable to use wetting agents as stickers, as some depress germination. A home-made sticker is easily prepared by dissolving 3 grammes of resin in 10 millilitres of methylated spirit. Larger quantities may be prepared by dissolving 6oz. of resin in 1 pint of methylated spirit. The sticker is used at the rate of 0.5 to 5 per cent. of seed weight, for example, ½ to 5lb. of sticker to 100lb. of onion seed. The lowest amount (0.5 per cent.) was found satisfactory in tests.

In general, experiments with various seeds and the treatments listed in this article have shown that treated seeds can be stored as long as untreated seeds.

Inhalation of flying dust over a period may cause injury, the severity of which will depend on the toxicity of the disinfectant used, the amount of dust inhaled, and the period of exposure. Skin irritation may also be caused by some materials.

Small-scale application of dusts is not risky. Large-scale application, however, may involve operators in some toxicity hazards and the following precautions are recommended to avoid injury.

1. Wear a clean dry cloth or a dry filter mask over the nose and mouth (Fig. 4). Dust-mask filters should be changed regularly according to manufacturers' directions.
2. Avoid accumulation of dust on the skin. Use protective ointment over exposed parts of the skin if sensitive to irritation.

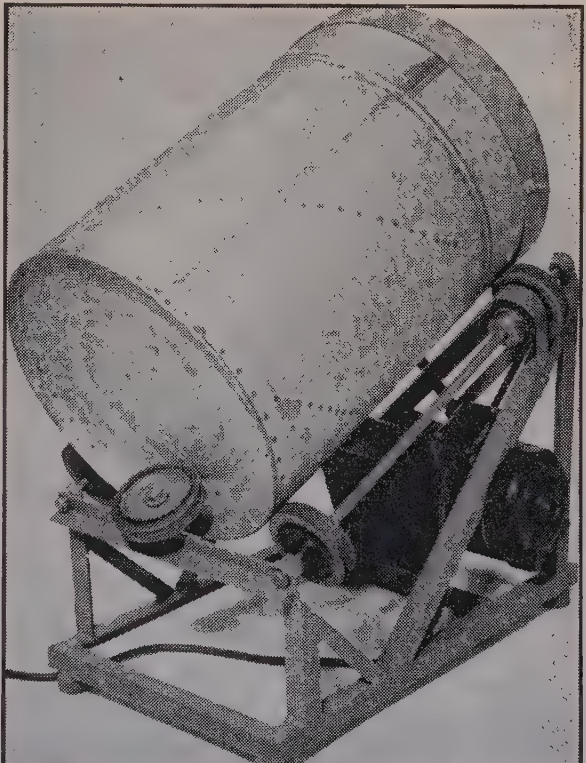


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Fig. 8—Rear and side view of an electrically powered, continuous-action seed-dressing machine.

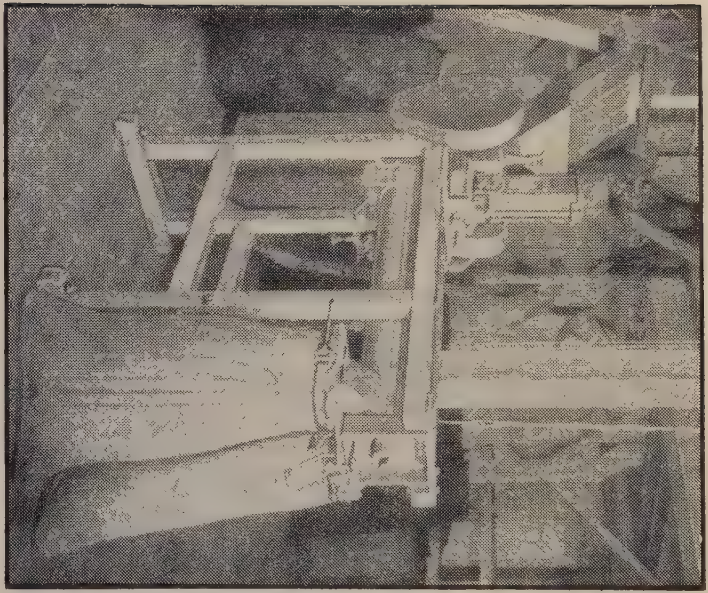

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Fig. 9—A continuous-action machine of a rotary type used for dusting large quantities of seeds.

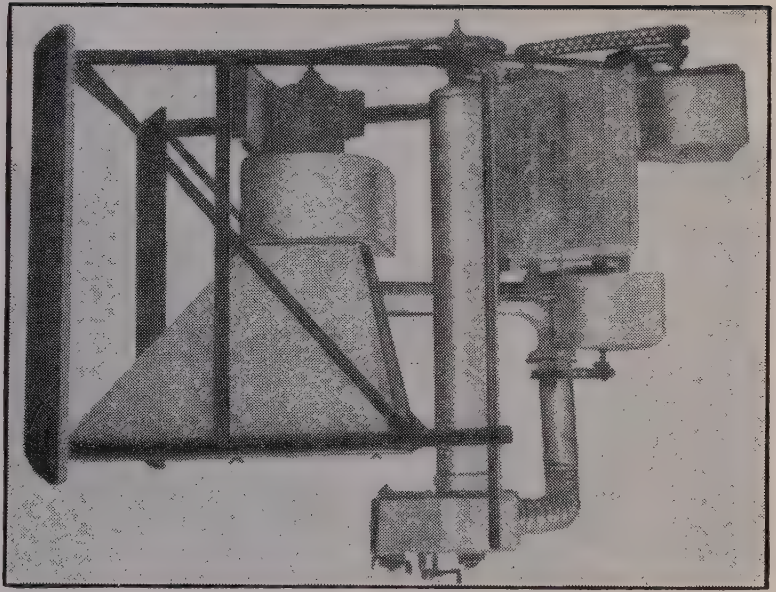

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Fig. 10—A seed-dressing machine fitted with an exhauster.

TABLE 2—SEED DISINFECTION BY DUSTING

Crop	Concentrations of Disinfectants and Amounts of Seeds Treated (The first column under each chemical shows "oz. per 100lb." and the second column shows "level teaspoons per pound")															
	D.D.T. (50 per cent. p.p.i.)		Ferbam		"Fernasan" or "Premasan"		"Lindane" (25 per cent.)		"Phygon"		"Spergon" or "Tetroc"		Thiram or "Tetram"		"Thirodust"	
Beans (french)	1.6(1)	¼	8.0(2)	½	4.0(2)	¾	1.6(1)	¼	2.0(2)	¼	4.0(2)	½	2.0(2)	¼	2.0(2)	¾
Beetroot ..	—	—	—	—	16.0(2)	3	—	—	4.0(2)	½	—	—	8.0(2)	1	8.0(2)	2¾
Broccoli ..	—	—	—	—	16.0(2)	3	—	—	—	—	8.0(2)	1	8.0(2)	1	8.0(2)	2¾
Brussels sprouts	—	—	—	—	8.0(2)	1½	—	—	—	—	8.0(2)	1	4.0(2)	½	4.0(2)	1½
Cabbages ..	—	—	—	—	8.0(2)	1½	—	—	—	—	8.0(2)	1	4.0(2)	½	4.0(2)	1½
Carrots ..	—	—	—	—	8.0(2)	1½	—	—	—	—	8.0(2)	1	4.0(2)	½	4.0(2)	1½
Cauliflowers ..	—	—	—	—	8.0(2)	1½	—	—	—	—	8.0(2)	1	4.0(2)	½	4.0(2)	1½
Celery	—	—	—	—	16.0(2)	3	—	—	—	—	8.0(2)	1	8.0(2)	1	8.0(2)	2¾
Cucumbers ..	—	—	—	—	8.0(2)	1½	—	—	—	—	8.0(2)	1	4.0(2)	½	4.0(2)	1½
Egg plants ..	—	—	—	—	4.0(2)	¾	—	—	—	—	8.0(2)	1	2.0(2)	¼	2.0(2)	¾
Kale	—	—	—	—	4.0(2)	¾	—	—	—	—	8.0(2)	1	2.0(2)	¼	2.0(2)	¾
Lettuces ..	—	—	4.0(2)	¼	16.0(2)	3	—	—	—	—	8.0(2)	1	8.0(2)	1	8.0(2)	2¾
Onions	—	—	—	—	800(2,3)	158	—	—	—	—	—	—	400(2,3)	62	400(2,3)	142
	—	—	—	—	32.0(2)	6¼	—	—	—	—	—	—	16.0(2)	2	16.0(2)	5½
Parsley ..	—	—	—	—	—	—	—	—	—	—	12.0(2)	1½	—	—	—	—
Peas	1.6(1)	¼	8.0(2)	½	4.0(2)	¾	1.6(1)	¼	2.0(2)	¼	4.0(2)	½	2.0(2)	¼	2.0(2)	¾
Pumpkins ..	—	—	—	—	4.0(2)	¾	—	—	—	—	6.0(2)	¾	2.0(2)	¼	2.0(2)	¾
Radishes ..	—	—	—	—	4.0(2)	¾	—	—	—	—	8.0(2)	1	2.0(2)	¼	2.0(2)	¾
Rhubarb ..	—	—	—	—	—	—	—	—	—	—	8.0(2)	1	—	—	—	—
Silver beet ..	—	—	16.0(2)	1	16.0(2)	3	—	—	4.0(2)	½	—	—	8.0(2)	1	8.0(2)	2¾
Spinach ..	—	—	—	—	8.0(2)	1½	—	—	4.0(2)	½	8.0(2)	1	4.0(2)	½	4.0(2)	1½
Sweet corn ..	—	—	—	—	3.0(2)	½	3.0(1)	½	2.0(2)	¼	3.0(2)	¼	2.0(2)	¼	2.0(2)	¾
Tomatoes ..	—	—	16.0(2)	1	16.0(2)	3	—	—	6.0(2)	¾	8.0(2)	1	8.0(2)	1	8.0(2)	2¾
Turnips ..	—	—	8.0(2)	½	8.0(2)	1½	—	—	6.0(2)	¾	8.0(2)	1	6.0(2)	¾	6.0(2)	2

Remarks: Diseases and pests controlled: (1) Storage insects and some soil insects; (2) Seed decay and damping-off; (3) Onion smut; a wetting agent is applied before dressing of seed.

3. Use gloves if handling large amounts of dusts.
4. Thoroughly wash hands, face, and exposed parts of the body before eating or smoking and at the end of operations.
5. Clean up spilt material and do not allow dust to accumulate on equipment or on the floor.
6. Label treated seeds distinctly.
7. Do not use treated seeds for food or for feeding to stock.

Methods of application are described in the following sections.

Small-scale Application

For treatment of seeds purchased in small packages and when the quantity of dust required is difficult to determine, a very small amount of dust, sufficient to cover ¼in. of the tip of a small pen-knife blade, is added to the packet, which should be shaken until the seeds and dust are well mixed (Fig. 5).

A more satisfactory way of applying a seed dust to small quantities of seeds is to weigh the seeds and the required quantity of disinfectant before placing both in a flask (Fig. 5) or a jar with a closely fitting lid. Seeds and dust are shaken for 5 minutes, thus ensuring adequate coverage.

A small machine holding a number of jars is used at the Plant Diseases Division, Department of Scientific and Industrial Research, for treatment of small quantities of seeds. This apparatus is electrically driven and is geared to give 40 revolutions per minute. At this speed seeds and dust are thoroughly mixed and an even coating is given to individual seeds. The machine is illustrated in Fig. 6.

Medium-scale Application

For treatment of moderate quantities of larger seeds such as peas and beans a small hand-operated duster is satisfactory. This may be made from a dust-tight drum provided with a closely fitting lid and mounted on trunnions (Fig. 7).

Thorough mixing of dust and seeds is essential, and is secured by mounting the container eccentrically on a shaft and providing interior flanges so that the seeds are thrown from side to side during rotation of the container. After the right amount of dust has been added the drum is turned for 5 minutes at 20 to 30 revolutions per minute. Care must be taken not to load the container beyond two-thirds of its total capacity.

An electrically powered seed-dressing apparatus designed by the Plant Diseases Division gives ease of operation and optimum coverage of seeds. The capacity of the mixing drum allows treatment of 30 to 40lb. of seeds. Fig. 8 shows this machine.

Large-scale Application

Machines for large-scale application of dusts are so constructed that large quantities of seeds may be subjected to continuous agitation for several minutes (Fig. 9).

Measured quantities of seed dusts are automatically added to the flow of seeds to give a predetermined dosage. The machine stops automatically if seed delivery falls short of that for which it has been set and over-dressing is thus avoided.

Other machines are of a gravity-feed type and give treatment by passing seeds and dusts by gravity over a system of cones and baffles, or of a type in which seeds and dusts are mixed by a rotating spiral conveyer.

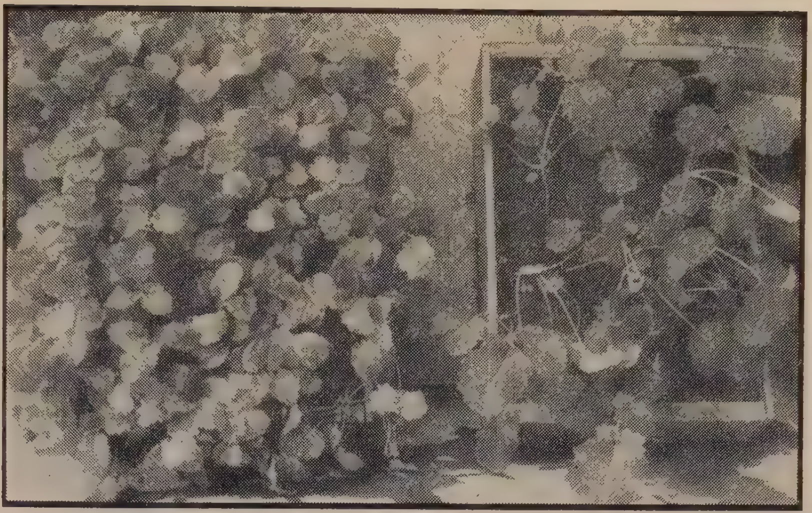

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Fig. 11—Effect of seed treatment on emergence of cabbage seedlings. Left—Seedlings from treated seeds. Right—Seedlings from untreated seeds.

Adequate ventilation of premises is necessary where large-scale seed-treating operations are in progress. Exhausters should be installed to draw off excess dust at the sacking end of some types of machines (Fig. 10). However, care must be taken to ensure that exhaust fans do not withdraw more than the excess dust.

Calibration of Large Machines

Calibration of large machines is done by:—

1. Determining the exact amount of seeds delivered for a given time at a given setting of the seed feeder.
2. Determining the exact amount of dust delivered for a given time and at a setting of the dust feeder corresponding to the desired dosage and the amount of seeds delivered.
3. Calibrating separately for each kind of seeds and disinfectant.
4. Recording accurately for each operation the amount of seeds treated and the quantity of disinfectant used.

Materials and dosages of dusts to be used on different vegetable seeds are listed in Table 2.

Beneficial effect of seed treatment is illustrated in Fig. 11.

The Slurry Method

The slurry or short, wet treatment has been developed to give a more uniform coverage of seeds with disinfectants than is obtained with dust treatment. Although this method has shown certain advantages when compared with dust treatment, it has not yet been introduced into New Zealand. It is suitable mainly for use by large seed firms for treatment of large quantities of seeds, as more expensive apparatus is required than that used for application of dusts.

The slurry method is the application of a disinfectant to seeds as a water suspension (slurry) instead of a dust. The slurry treater synchronises the flow of seeds and the slurry.

High concentrations of wettable powders are used. These are formulated in a similar manner to that of dusts, but include instead of a lubricant a wetting agent and in addition a dispersing agent. The amount of water used for seed treatment is not sufficient to raise the moisture content of the seeds by more than 0.5 per cent. Seeds on leaving the mixer are coated with a uniform layer of fungicide or insecticide. Coverage of seeds is more permanent than in dust treatment.

Small amounts of seeds can be treated in a conical flask or a jar. Larger quantities are treated by special machines. Principles of a slurry machine (Fig. 12) are as follows: Flowing into the hopper from an overhead bin, the seeds are

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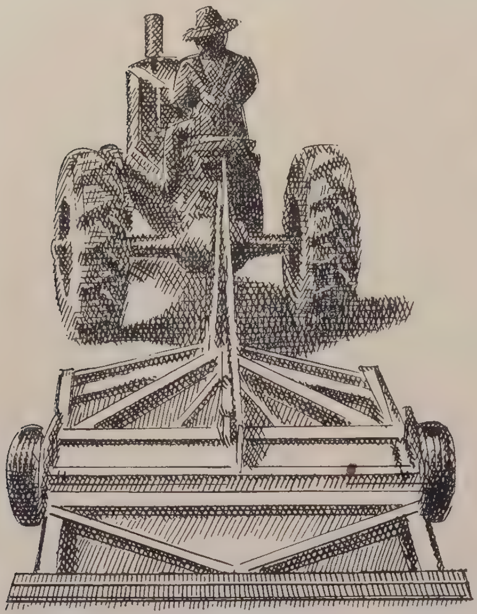

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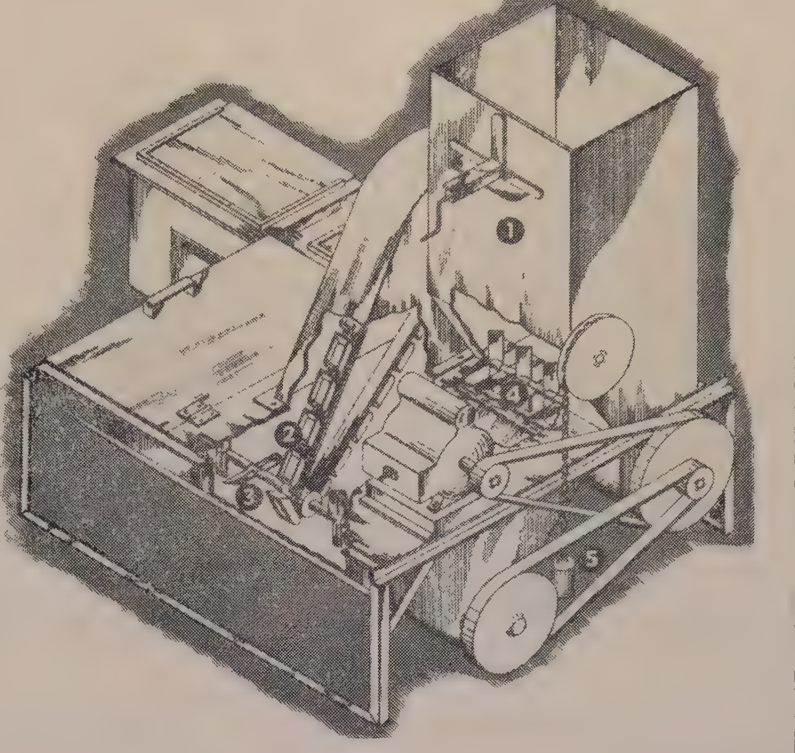
measured by a tilting seed pocket. When a certain quantity of seeds has flowed into the pocket, the pocket tilts and dumps its load into the treating chamber. A counterweight returns the pocket to its original position. The movements of the seed pocket are transmitted to an endless chain, equipped with small slurry buckets, by means of a shaft fixed to the back edge of the pocket. The slurry buckets are filled with sufficient chemical suspension to treat the seeds measured by the pocket. Seeds and slurry are supplied simultaneously into the mixing chamber. Distribution of the slurry over the surface of the seeds in the treating chamber is done by rapidly revolving agitator blades. The rate of flow of seeds may be adjusted, and any change in the rate of flow is automatically accompanied by a change in the flow of slurry.



[After Calkins

Fig. 12—A slurry seed-treating machine. 1—Seed pocket. 2—Slurry buckets. 3—Slurry tank with agitators. 4—Mixing chamber with agitators. 5—Counterweight.

Seeds leaving the machine can be sacked directly if application of disinfectant is correct. Calibration of machines may be done in a similar way to that given for dusting machines.

Another method of applying liquid seed disinfectants is by directing high-pressure spray against a descending stream of seeds. Treated seeds are then thoroughly agitated by a paddled shaft running in an inclined cylinder before they are discharged into sacks.

Recommended Slurry Treatments

Materials and dosages to be used on various vegetable seeds are given in Table 3.

Valuable features of the slurry method of application are that it is rapid in operation, does not contaminate the atmosphere with dust, is economical in material, and ensures thorough coverage.

Disadvantages of this method compared with dusting are that the equipment is more expensive, incorrect concentrations of disinfectants may cause seed injury, and it is not suitable for seeds of high moisture content, especially at temperatures below 50 degrees F.

Hot Water Treatment

The hot water process is used for control of diseases and pests carried within the tissues of various seeds. Disease organisms are killed by temperatures lower than those tolerated by seeds.

Hot water treatment includes several operations as follows:—

(a) **Pre-soaking:** For certain species it is necessary first to soak the seeds in cold water to make them more permeable to heat. The seeds are placed in cheesecloth bags or wire baskets which are then immersed in a container of cold water. Duration of the pre-soak is shown in Table 4. Seeds are drained before being placed in the hot water container.

TABLE 3—SEED DISINFECTION BY THE SLURRY METHOD

Crop	Concentrations of Disinfectants and Amounts of Seeds treated (for prevention of seed decay and damping-off)							
	"Fermspray"		"Phygon XL"		"Spergon Wet"		"Thirospray"	
Beans (french)	2.75	2300	1.5	1500	2.0	1800	2.25	1900
Beetroot	—	—	2.0	800	—	—	—	—
Brussels sprouts ..	—	—	—	—	4.0	800	1.5	1050
Cabbages	—	—	—	—	4.0	800	1.5	1050
Carrots	—	—	—	—	4.0	800	1.5	1050
Cauliflowers ..	—	—	—	—	4.0	800	1.5	1050
Cucumbers	—	—	1.5	2550	2.0	800	2.25	3000
Egg plants	—	—	—	—	4.0	800	1.5	1050
Kale	—	—	—	—	4.0	800	1.5	1050
Lettuces	3.0	1550	1.5	1150	4.0	800	2.25	1150
Onions	—	—	—	—	—	—	1.5	1280
Peas	3.0	2400	2.0	1800	2.0	1800	1.5	1250
Pumpkins	—	—	3.0	4800	2.0	800	1.5	1800
Silver beet	—	—	2.0	800	—	—	3.25	2000
Spinach	—	—	2.0	800	—	—	2.25	1550
Sweet corn	—	—	3.0	3600	3.0	2700	2.25	3050
Tomatoes	—	—	3.0	1200	—	—	2.25	1570
Turnips	—	—	—	—	—	—	2.25	1700

(The first column under each chemical shows in pounds weight the quantity of disinfectant required for 1 gallon of water, and the second column shows in pounds weight the quantity of seed which can be treated by 1 gallon of disinfectant mixture.)

(b) **Steeping:** For this process a container is fitted with some means of heating such as an electric element. A thermostat is necessary to hold the water temperature to within half a degree of that required. A good-quality thermometer which has been standardised is used to check temperatures. Constant agitation of the seed mass is necessary. Duration of immersion and temperature of the steep influence disease control and seed injury. Seeds are removed from the steep and drained before the next step.

(c) **Post-steeping:** Seeds are immersed for a short time in cold water.

(d) **Drying:** Seeds may be spread out to dry in a warm room. High temperature or direct sunlight should be avoided, as quick drying may affect germination.

(e) **Protection:** When dry, seeds should be treated with a dust to protect them from recontamination with seed-carried organisms and from harmful soil fungi.

The value of hot water treatment is that it eliminates seed-borne diseases which cannot be controlled by other means. This method, however, is difficult to apply and as it is liable to depress germination, especially when

TABLE 4—HOT WATER SEED TREATMENT

Crop	Pre-soak		Steep		Diseases controlled
	Time	Temperature in degrees F.	Time (minutes)	Temperature in degrees F.	
Cabbages ..	—	—	25	122	Dry rot
Celery ..	—	—	10	136	Leaf spot
Peas ..	18 hours	approx. 55	20	118	Collar rot
Swedes ..	15 mins.	approx. 55	50	124	Dry rot
Turnips ..	—	—	30	122	Dry rot

old seeds are used or when temperature measurement is inaccurate, its use is limited mainly to treatment of nucleus lines of seeds.

Hot water treatments effective in control of various diseases in some crops are given in Table 4.

Special Treatments

Some diseases such as tomato canker, tomato speck, tobacco mosaic, and tomato streak of tomatoes, and eelworm of onions may be controlled by the special treatments described here.

Treatment of Tomato Seed

Acid extraction: Add 1 fl. oz. of concentrated hydrochloric acid to the pulp from every 5lb. of fruit. Thoroughly mix the pulp with the acid and allow the mixture to stand for 3 hours, stirring it at intervals. After treatment force water under pressure into the mixture and carefully pour off the water and pulp. Repeat this process until the seeds are clean. Strain off the water through clean muslin and spread the seeds thinly on newspaper to dry. Wooden or glass containers should be used for this process, as the acid corrodes metal. Damp seeds should not be allowed to come in contact with metal.

Acid extraction eliminates the seed-carried diseases tomato canker, tomato speck, tomato streak, and tobacco mosaic. It is advisable to dust acid-extracted seeds with a recommended material for control of soil-borne damping-off.

Acidulated mercuric chloride treatment: Tomato seeds which have not been treated by acid extraction and which could be infected with bacterial canker should be soaked for 5 minutes in acidulated mercuric chloride solution (1 gramme of mercuric chloride dissolved in 2.5 millilitres of concentrated hydrochloric acid added to 2000 millilitres of water). After treatment seed should be dipped in skimmed milk and dried. Dipping in skimmed milk neutralises any further action of the acid, which could be detrimental to germination. After drying, seeds should be dusted with a recommended material.

Fumigation of Onion Seeds

Onion seeds are sometimes infested with eelworm (*Anguillulina dipsaci*). Fumigation with methyl bromide is recommended for control of this pest. Treatments for small and large quantities of seeds are as follows:—

Small quantities: For treatment of seeds in bottles fitted with ground-in glass corks or in other airtight containers 30 mg. of methyl bromide per litre are used. The time of exposure required to obtain complete control is 20 hours.

Large quantities: For treatment of seeds in vaults concentrations of fumigant should be increased to 60 fl. oz. per 1000 cub. ft. to cover leakages and possible absorption of the fumigant by the seeds or by other materials in the vault.

Germination of onion seeds is not adversely affected at these concentrations.

Use of Old Celery Seeds

Seed transmission of leaf spot of celery (*Septoria apii*) can be avoided by planting seeds more than 2 years old.

Book Review

"Farm Animals": John Hammond

SINCE the first edition was published in 1940 Hammond's "Farm Animals" has enjoyed a well-deserved international popularity among students and progressive farmers. The 1952 edition follows substantially the same lines and style as those in the first volume.

This new work merely brings up to date the very many subjects covered, and in addition includes a few new sections on animal production. Thus the section on genetics in relation to the practical problems of breeding farm animals covers considerably more ground than the previous treatment of the subject, presenting a useful summary of present knowledge. At the same time, it is noted that the author still retains his belief in the necessity for selection in an environment which will develop properly the character required. This view has, of course, been seriously challenged by New Zealand studies with identical twin cattle, from which it has been clearly demonstrated that selection for high milk production at least can be effective in a poor environment.

The book can be thoroughly recommended, however, to anyone seeking, in a compressed form, a knowledge of the wealth of factual data on farm animals which now exists. Dr. Hammond has an extremely able telegraphic style which permits him to compress a vast array of facts into a very small space. He is also able to give us the benefit of his own interpretation of these facts and his general philosophy of animal production in an extremely clear manner. The book is well documented and will undoubtedly be a great success.

Edward Arnold and Co., London. 18s. net.

—*C. P. McM.*

Use of Molybdenised Fertilisers

THE superphosphate-manufacturing companies have adopted the Department of Agriculture's recommendation that sodium molybdate should be incorporated into molybdenised fertiliser mixtures at 1lb. per ton in the North Island and 2lb. per ton in the South Island. These quantities, based on the approximate topdressing average of 2½cwt. per acre in the North Island and 1¼cwt. per acre in the South Island, give 2oz. of molybdate per acre.

There is still much to be learnt about molybdenum in the soil: the areas of deficiency, the soil types involved, the part it plays in plant nutrition, its interrelation with other nutrients, and other points. As knowledge is gradually extended as the result of research work in New Zealand and overseas the information will be published in the "Journal of Agriculture". In the meantime farmers should not depart from their normal liming and fertilising programmes unless advised to do so by local Instructors, except to the extent of trying out molybdenised fertiliser on an experimental scale if they feel so disposed.

In this event the present application rate of 2oz. per acre should not be greatly exceeded; good responses have been obtained from as little as 1/16oz. per acre. Nor should applications be repeated within 2 years.

Development of a North Canterbury Downlands Farm

THE present need for maximum primary production demands the full development of New Zealand's agricultural resources, including the once fertile downlands of Canterbury. The application of proved farming methods to these soils can and has resulted in a substantial increase in their productivity. Because of the farming practices adopted in the past parts of the downlands and foothills of Canterbury became problem areas, but during recent years a number of farmers have by the adoption of different practices created good mixed farming units and shown that the area has a considerable productive potential. In this article R. A. Milne, Instructor in Agriculture, Department of Agriculture, Rangiora, describes the methods adopted by one farmer on the North Canterbury downlands to restore this type of country, and shows that these areas can be readily developed to the stage where they are once again making a major contribution to New Zealand's primary production.

THERE are in North Canterbury considerable areas of downlands in the Ashley and Kowai Counties on the outer fringe of the foothills between the Ashley and Waipara Rivers. The downlands have been subdivided and settled since the early days of the Canterbury Province and have been used mainly for mixed farming with the emphasis on the growing of cereals. The consequence of the continued heavy cropping of these soils has been a steadily declining fertility with a resultant lowering of yields.

Without the use of lime and phosphate and the better strains of pasture species now available, pastures were difficult to establish and maintain and quickly reverted to browntop and in some instances gorse. The carrying capacity of these pastures was low, and sheep came to be regarded as of secondary importance to cropping. Since the depression of the 1930s, however, there has been a decline in the area in crops, and greater interest is now being taken in grassland farming. As better pastures are established and the use of lime and phosphate becomes more widespread the crops formerly grown are being partly replaced by pasture seed production.

Climate

The downlands lie approximately within the 25in. to 35in. rainfall belt with the average annual precipitation increasing nearer the hills. The rainfall is spread fairly evenly throughout the year, although considerable variation in distribution occurs. As with the rest of Canterbury prolonged droughts are experienced occasionally, although the effects are less severe on the clay downlands soils than on the light shingle soils of the plains.

Soils

The soils of this area are mostly silt loams derived from greywacke loess. There are two main soil types; the Ashley silt loam on the higher downs and the Mairaki silt loam on the lower undulating downs. A typical profile of the Ashley silt loam is 9in. of dark grey silt loam over 5in. of pale yellow silt loam over 12in. of pale yellow mottled clay loam. The Mairaki silt loam is 10in. of dark grey silt loam over 6in. of light grey mottled silt loam on 10in. of pale olive-grey loam. The Mairaki soil has impeded drainage and is difficult to drain.

The structure of these silt loam soils is poor and they are low in organic matter, with the result that cultivation is difficult. They are not easily worked down to a seed-bed, particularly when they have been overcropped.

Downlands Development

Many farms within this area which once could scarcely pay their way are now being developed into highly productive units. The key to success in developing run-out downlands farms is the establishment of high-producing pastures. With good pastures stock-carrying capacity is high and fertility is quickly restored to a level which will support depletive cereal cropping.

In most instances a rotation which includes both supplementary crops such as rape and turnips and a limited

HEADING PHOTOGRAPH: A general view of the farm showing the nature of the downlands.

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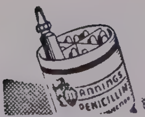

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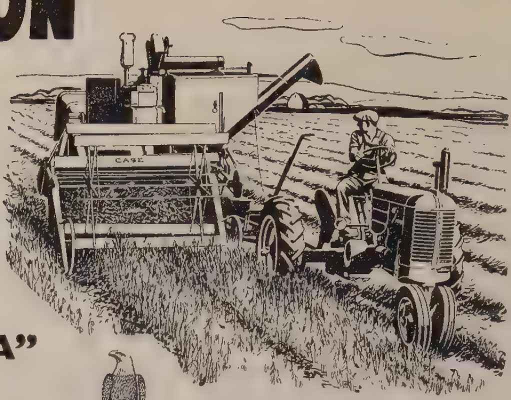

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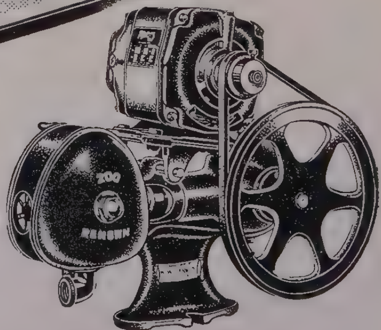

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amount of cash cropping is used. The most important feature of these rotations is the inclusion of a fallow period before sowing down to new pasture, and it is this fallow, together with the use of the better strains of grasses and clovers, which enables the establishment of pastures capable of restoring the fertility lost in cropping. The limited amount of cash cropping provides the money for financing further development work.

The downlands soils respond readily to applications of lime, and dressings of up to 2 tons per acre are necessary to provide the soil conditions essential for the establishment and maintenance of clovers in the sward. Responses to dressings of phosphate are also obtained on the downs, but it is essential for lime to be applied to obtain the maximum benefits.

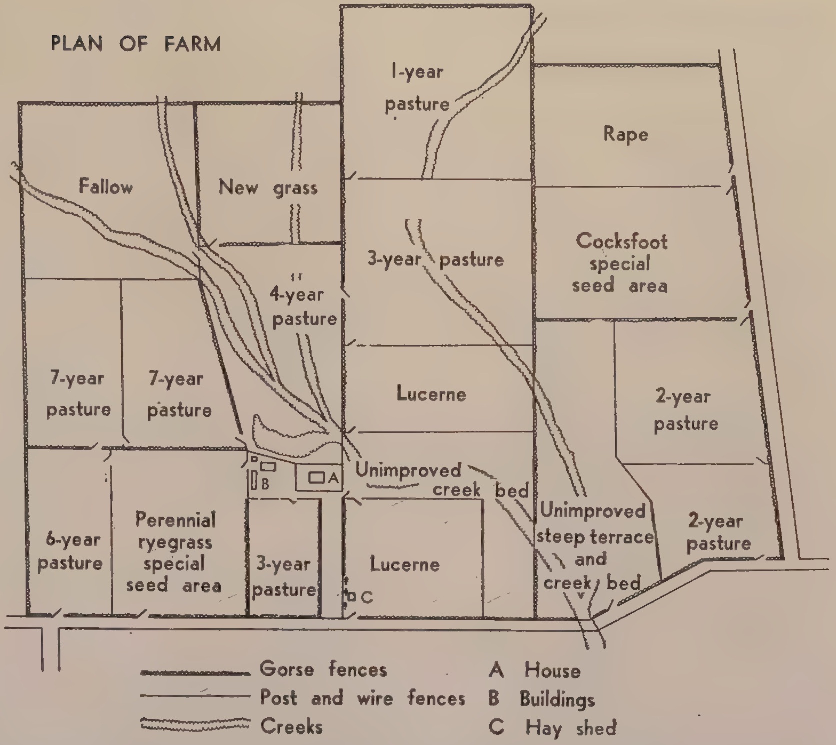
Typical Farm

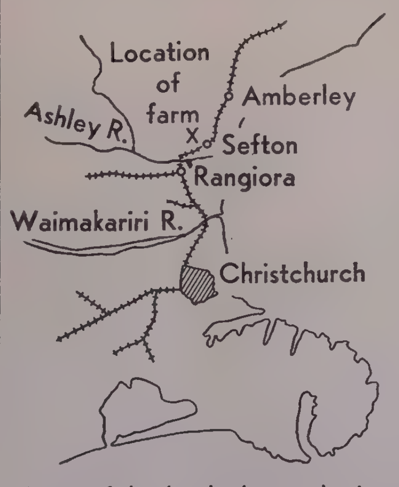
The farm described in this article is in the Sefton district of the Kowai County and is fairly typical of the downlands as a whole. It has a fairly stiff clay subsoil over most of the area and has had a history of heavy cash cropping. During the Second World War it was farmed on a short-term lease and in response to the demand for maximum production was heavily cropped, up to half of the farm being in cash crops in some seasons.

The original property purchased in 1946 consisted of 150 acres with a further 24 acres occupied by creeks. In 1950 an adjoining area of 68 acres was added to the property, which now totals 218 acres. The farm lies on the outer fringe of the downlands, and about half the area is flat to gently rolling with the remainder running on to the steeper rolling downs. All but small isolated areas can be handled with a wheeled tractor. The farm is broken by creeks and gullies and is subdivided into 17 paddocks ranging from 4 to 18 acres.

Development Programme

When the present owner took over the property 64 of the 150 acres of arable land were in stubble and the remaining 86 acres were in pasture. The more easily worked areas had been heavily cropped and the steeper areas left in pasture, which had reverted to browntop and weeds and produced little feed.





A map of the downlands area showing the location of the farm (X).

The owner realised that the continuation of a mixed farming system based on cash cropping would provide at best only a subsistence living without arresting the decline in soil fertility. He decided, therefore, to reverse the fertility drain by reducing cropping to a minimum and to get the whole property sown down in good, high-producing pastures as rapidly as possible.

A limited amount of cash cropping has been carried on during the development period, partly because crops fitted into the rotations used and partly because they provided some of the cash necessary for further development. High prices for pasture seeds during this period have enabled the area of cash crops to be reduced to a minimum.

Rotations

In the development of this farm no fixed rotation has been followed. This has been because weather conditions have at times dictated farming practices and the high prices received for grass and clover seeds have enabled short cuts to be taken in the programme of sowing down to good pasture. The two rotations mostly followed have included both supplementary and cash crops, but both have included a summer fallow preparatory to sowing down. The rotations used have been (a) old grass—turnips or chou moellier—rape—fallow—pasture and (b) old grass—cash crop—greenfeed—fallow—pasture.

These rotations have not always been strictly adhered to. At times more than one cash crop has been taken and at others a cash crop has replaced rape in the rotation. The basic object of preparing the land for sowing down to pasture has, however, always remained constant, and the summer fallow has always retained its place in the rotation used.

Cropping

Over the period of development cropping has been kept to a minimum and has been undertaken solely in conjunction with the renewal of pastures. During that period a total of 80 acres of cash crops has been grown, which is little more than the amount grown in the season immediately before the property was bought.

Almost the whole of the crops grown have been spring-sown peas, oats, barley, or linseed. The down soils can be difficult to work down to a seedbed in a wet autumn, and the owner claims that spring crops can be grown with a greater assurance of success. A further consideration influencing the owner in his choice of crops has been that, as the crops are only a prelude to pasture renewal, spring crops occupy the ground for a shorter period than autumn crops and subsequent cultivation is facilitated.

Supplementary Crops

Over the past years turnips, chou moellier, and greenfeed have been grown for winter feed. The production from these crops has varied, and the owner has found that the mixture of chou moellier and turnips has given the best results. However, in the last 2 years no winter supplements have been grown and stock has been wintered on lucerne hay, saved autumn pasture growth, and greenfeed.

Greenfeed crops grown have been mainly oats, but Italian ryegrass has

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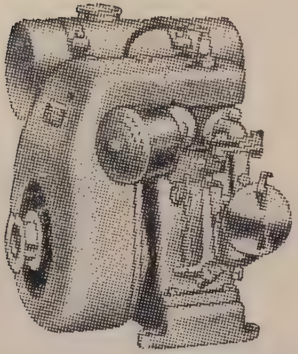

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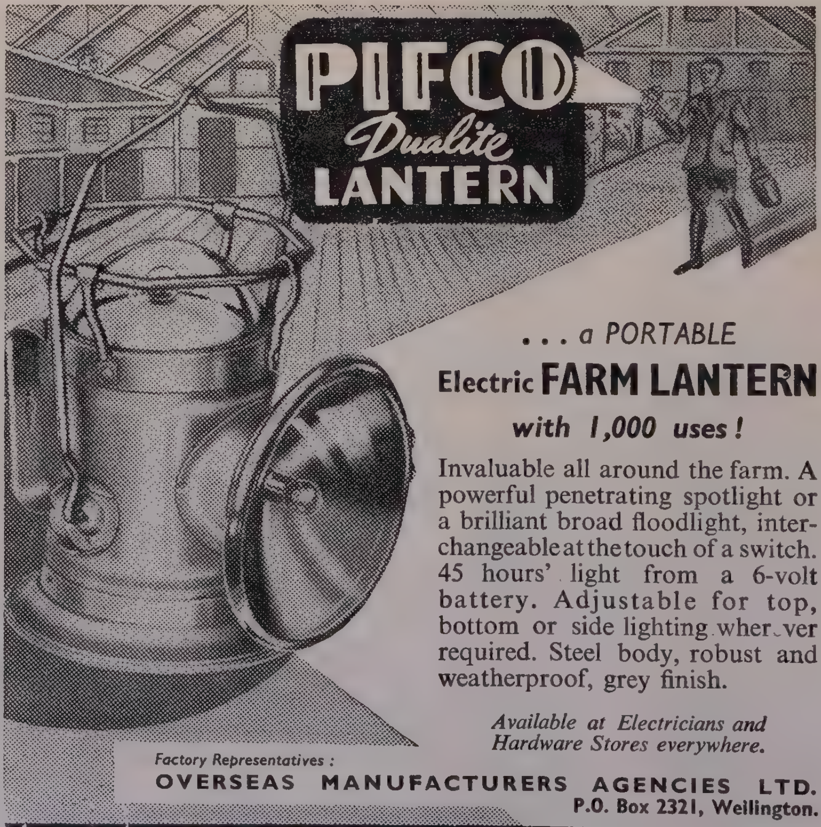

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Left—A close-up of a lucerne crop on the farm. Lucerne fills an important place in providing hay and grazing and an occasional seed crop. Right—The establishment of vigorous ryegrass-white clover swards such as that shown in this close-up is possible through the use of Certified seeds, lime, and phosphates.

been grown occasionally with good results. Rape has always been grown for lamb fattening, but with the expansion of the area in lucerne it is hoped to be able to dispense with rape and fatten all weaned lambs on lucerne. A well-established stand of lucerne will produce even in a dry season in which rape could be a failure, and a permanent area of fattening feed means a considerable financial saving.

Pastures

The aim during the period of development has been to break up the whole of the farm, prepare the land, with as short a period of cropping as the finance available and the demands of the stock permit, and return to pasture. The short period in crops has been regarded solely as a preparation for the sowing of pasture, and all pastures on this farm with one exception have been sown down after a summer fallow.

This one exception was in the first months of occupation, when an area of 23 acres of oat stubble was prepared and sown down. The following autumn a further 30 acres of stubble was sown down after almost a full year's fallow. These early pastures were sown with improved strains of pasture species on a well-prepared seed-bed and were given a ton of lime and 1cwt. of superphosphate at sowing. The grasses established well in these pastures, but the clovers were slow to thicken up. However, in subsequent seasons they produced well. The success of these early pastures can be seen from the fact that they were still of good composition after 6 years.

During the 6 years since beginning the development the owner has worked round the farm paddock by paddock until today all have been broken up and renewed. The second round of pasture renewal has been begun and fertility has been so raised that cash cropping will now have a major place in the rotation.

Pasture Establishment

The time of sowing down pastures has been delayed in some years because of the owner's insistence on liming before sowing, and pastures have sometimes been sown as late as early March. The aim, however, has always been to have pastures sown by mid-February at the latest. Seed mixtures are always drilled on a firm seed-bed prepared over summer and 1cwt. of superphosphate is drilled with the seed.

Seed mixtures used vary with requirements. Where seed production is intended a simple mixture of 1 bushel of perennial ryegrass and 3lb. of white clover is sown. The highest grades of Certified seed available are used. For purely grazing purposes 2lb. of Montgomery red clover, 4lb. of cocksfoot, and 1lb. of crested dogstail are added, but the lower grades of Certified seeds are used.

Pasture Management

In the past new pastures have not made very much growth in the first autumn, due in some cases to late sowing. Consequently new grass paddocks do not generally get their first grazing until lambing time in early spring. Pastures are then grazed rotationally until the flush of spring growth, when new pastures intended for seed are closed for a ryegrass seed crop. The ewe flock keeps the pastures grazed closely throughout spring and, depending on feed supplies, further areas are closed for white clover seed.

Improved pastures on the farm have resulted in increased carrying capacity and a rapid build-up in fertility.

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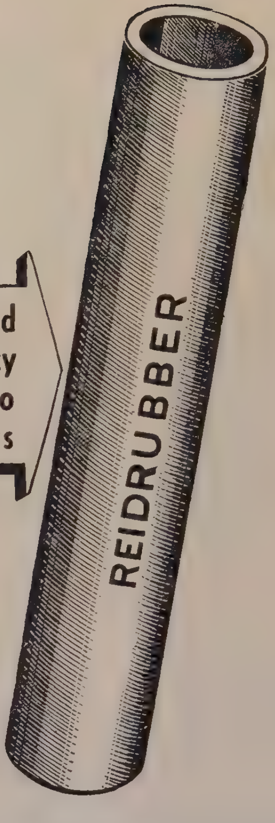

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A view of the farm homestead and buildings.

To help control the flush of feed during spring and to utilise the threshed ryegrass and white clover straw the owner now runs a small herd of beef cattle.

In addition to the ton of lime and 1cwt. of superphosphate applied at sowing down pastures receive a further ton of lime in the third year, and during the life of a pasture about 3cwt. of superphosphate is applied. Pastures harvested for ryegrass or white clover always receive a topdressing of superphosphate during the following autumn.

Pasture seed production has been a feature of the farm during the period of development. Control of the improved pastures has been possible in the past by closing areas for seed production, and the practice has been to close paddocks for ryegrass seed in the first year and for white clover in subsequent years.

However, in the last 2 years specialised seed production areas have been established. Two years ago Certified Government Stock perennial ryegrass seed was sown in one area and this year another area has been sown with Certified Government Stock cocksfoot seed. The ryegrass area has been closed for seed for the second time, and before closing has received each season a dressing of 1cwt. of sulphate of ammonia.

Yields of ryegrass and white clover have been satisfactory. In the 1952 season ryegrass yielded 42 bushels of machine-dressed seed and white clover 120lb. of machine-dressed seed to the acre.

Stock Management

The success of the development policy can be seen from the carrying capacity of the improved pastures. Stock numbers have increased steadily and have fully justified what may be regarded as expensive methods of pasture establishment and maintenance. In the first year of occupation, 1946, 160 ewes were carried. By 1949 this number had risen to 450, and today there are 560. It is intended to stabilise the number at approximately 600 while prices for pasture seeds remain at their present levels.

At first half-bred ewes were purchased, but in 1950 a change was made to Romney cross. This year the owner has changed to straight Romney ewes, which he expects will be more suitable for the type of country and the improved pastures now available. Replacements are brought in annually and the policy now is to purchase 2-tooths.

Southdown rams are used and are turned out with the ewe flock early in March so that lambing begins in early August. This early lambing enables a big proportion of lambs to be sent to the works early and at a time when feed supplies are beginning to get short. In addition it enables the maximum area to be closed for small seeds.

Lambing percentages for this class of country are not high, ranging from 105 to 110 per cent., but the proportion of 2-tooths in the flock and the often unsuitable lambing weather in August adversely affect these figures. It is expected that the change to a straight Romney ewe will effect an improvement in lambing percentages.

The number of lambs drafted fat off the mothers over the past 6 years has ranged from 60 to 75 per cent. at an average weight of 33 to 36lb. The remaining lambs are fattened on rape after weaning in early January. It is intended to fatten weaned lambs on lucerne.

Culled ewes are fattened on the ryegrass—white clover stubble and on second-growth rape. Replacement ewes are purchased at the annual ewe fairs during early autumn.

Some stock troubles are experienced, and probably the most serious has been a high death-rate in lambs in some years from pulpy kidney. However, the practice now is to vaccinate all lambs against this disease at tailing time, and in recent years few deaths from this cause have occurred. Foot-rot has been troublesome in wet seasons and has been one of the reasons for the change to Romneys. A good deal of work has to be put in with the ewe flock in wet seasons to combat foot-rot, and the owner has placed bluestone in the gateways so that both ewes and lambs are treated whenever they are shifted to fresh paddocks. All lambs are dosed for worms at weaning as a preventive measure.

Ewes are crutched in June and shearing is generally carried out in late November or early December. Wool weights over the last 6 years have averaged 9½lb. per ewe, with the average now rising with the change from a fine- to a coarse-woolled breed.

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autumn-saved pasture together with good lucerne hay forms the basis of the winter feed supply for the ewe flock. In most years this is augmented by a paddock of greenfeed.

To provide the hay supplement an area of 16 acres of lucerne has been established, and this area will be increased by a further 16 acres. The 32 acres of lucerne will provide ample hay supplies for winter feed from one cut and will then be available for grazing by the ewe flock or as a fattening feed for weaned lambs.

The foregoing is an outline of the progress of development on one downlands farm, and during the 6 years a good deal has been achieved. The most important achievement has been the reversal in the soil fertility trend by the adoption of a programme based on improved pastures with a minimum of depletive cash crops. The position has now been reached where the whole of the farm has been sown down to pasture and a rotation including cereal cropping can be followed without impairing soil fertility. In fact, the fertility build-up has been such that it would be beneficial, from the point of view of re-establishing pasture, to cash in on that fertility in the form of crops. It is the farmer's intention to follow a rotation on the second round of pasture renewal which includes one cash crop, and the land is in such good heart that he could if he wished take two cash crops in succession without detriment to the soil.

For the control of spring growth of pastures on the farm a small mob of cattle is run.

An interesting feature of the management policy of this farm is the attempt to achieve what is almost pure grassland farming. Under the dry Canterbury conditions pure grassland farming cannot be achieved entirely because of the need to renew pastures. Although on this farm cultivated supplementary crops are being eliminated, there is still the need to break up old pasture for renewal. Whether the experiment of relying entirely on pasture and lucerne for out-of-season stock requirements will be successful remains to be discovered, but winter supplementary crops have not been necessary in the past 2 years.

Some form of cropping is necessary in the period between the breaking up of old pasture and the establishment of new pasture, and on most farms the requirements of stock dictate to some extent the type of crops to be grown. On this farm, however, neither winter nor fattening supplementary crops are grown, and the rotation to be followed is a simple one; old grass—cash crop—greenfeed—summer fallow—pasture.

This is not recommended as the ideal rotation on the downlands soils, but it is one which is suitable for the farming policy on this farm. Many variations of the above rotation can be made to suit conditions on particular farms, taking into consideration the needs of the stock and the state of the soil fertility.

Many farms which have been badly depleted in the past are now being developed into highly productive farm units. In all cases the basic principle is the same even though the methods used may be dissimilar. The principle is the establishment and maintenance of high-producing pastures by the use of the better strains of pasture plants, lime, and phosphate. This objective can only be achieved in the early stage by greatly reducing the intensity of depletive cash cropping and allowing soil fertility to recover by a period under good pasture. When this stage has been reached the soil can support a system of mixed farming based on cash cropping.

The area in good pasture on the downlands of North Canterbury is increasing each year, and if necessary this area could once again become a contributor to New Zealand's wheat harvest.

A close-up of a typical sward before development consisting of browntop, annual clovers, and flatweeds.

All photographs by Ray Hassall.

Care of Livestock during October

Contributed by the Animal Research Division

CATTLE TICK CONTROL

WHERE cattle ticks are plentiful spraying or dipping should be carried out in November and December to prevent tick worry and kill the adult female ticks before they lay their eggs.

MATING OF DAIRY COWS

Before each cow is mated two heat periods or an interval of at least 30 days should be allowed after calving. Cows mated before this period are less likely to get in calf, and the chances of contaminating the bull are increased. Hand mating should be practised and accurate records kept showing the bull used and the dates of all services. Should breeding trouble occur, these records will be of considerable assistance in arriving at a correct diagnosis.

COCCIDIOSIS IN CALVES

Scouring in calves under 6 months of age is seldom due to worms. It is much more likely to be due to coccidiosis, especially if blood is present in the droppings. Effective drugs are available for treatment, but these can be obtained only on the prescription of a veterinary surgeon, who should be consulted.

BLACK DISEASE VACCINATION

In the east coast areas of the North Island where black disease of sheep occurs vaccination should be carried out during November or early December. This will protect the sheep against the disease, which occurs mainly in summer and autumn. Vaccine should be ordered immediately.

BLOOD POISONING FOLLOWING SHEARING

Deaths in sheep following shearing may be caused by infection of cuts or bruises with the blackleg germ. This disease can be prevented by vaccinating at least 3 weeks before shearing. Sheep which have been vaccinated previously may not require re-vaccination, and a Veterinarian or Inspector of Stock should be consulted about the best procedure.

BLOWFLY STRIKE IN EWES

In districts where crutch strike causes trouble in ewes crutching or early shearing is advised. Close supervision is necessary to detect cases so that suitable treatment can be applied before the strike becomes too extensive. When treating cases of fly strike shear the wool away to leave a 1in. margin of clean skin around the affected area. Remove the maggots by tapping the area with the shears and apply some reliable non-irritant dressing. Irritant fluids such as kerosene tend to cause restrike.

BLACK-HEAD IN POULTRY

Young turkeys and poultry are affected by black-head disease and it can best be prevented by rearing these on land which has not been contaminated by adult poultry. If an outbreak occurs, kill all affected birds and move the remainder to clean ground. In the event of a bad outbreak the local Poultry Instructor of the Department of Agriculture should be consulted, as in some cases treatment may prove beneficial.

GREENLEG IN BROODER CHICKENS

Greenleg in brooder chickens occurs in poorly ventilated brooders, especially if they are over-crowded and damp. At the first sign of trouble the necessary measures should be taken to ensure that ventilation is adequate and the litter is changed if it is at all damp.

ROUND WORMS IN POULTRY

Infestation by round worms is one of the most important causes of poor development of young birds. All growing stock should be treated twice with carbon tetrachloride, once at 3 months old and again at 5 months.

SUPPLEMENTARY FEED

Supplementary feed is essential to ensure the proper feeding of cows in winter and in dry summers and to control facial eczema in autumn. As soon as more pasture is available than is necessary to meet the immediate needs of stock, the balance should be shut up for silage or hay. On a well-managed dairy farm it should be possible to shut up at least 40 per cent. of the pasture. Crop growing for fattening of weaned lambs is standard practice in South Island districts, and it could with advantage be adopted more widely in North Island districts which experience a dry summer. Crops such as thousand-headed kale and turnips in addition to providing excellent fattening feed for lambs are a splendid insurance against facial eczema. In Poverty Bay and Hawkes Bay they should be sown before the end of October so that they can be well established before dry weather sets in.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during July and for the 12 months ended 31 July 1953, with comparative figures for the same month and 12-monthly period of 1951-52, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period		Tons		Percentage inc. or dec.
	Creamery	Whey	Total	
July 1953	2,234	12	2,246	—
July 1952	1,700	7	1,707	—
Increase or decrease ..	+534	+5	+539	+31.575
12 months ended 31/7/53	162,259	3,159	165,418	—
12 months ended 31/7/52	156,598	2,654	159,252	—
Increase or decrease ..	+5,661	+505	+6,166	+3.872

Butter in store at 31 July 1953 was 2727 tons

CHEESE

Period		Tons		Percentage inc. or dec.
	White	Coloured	Total	
July 1953	194	—	194	—
July 1952	60	—	60	—
Increase or decrease ..	+134	—	+134	+223.333
12 months ended 31/7/53	103,477	140	103,617	—
12 months ended 31/7/52	91,107	751	91,858	—
Increase or decrease ..	+12,370	—611	+11,759	+12.801

Cheese in store at 31 July 1953 was 9027 tons

If these figures are converted into butterfat equivalent, there is an increase of 5.714 per cent. in butterfat graded for the 12 months as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Turnip and Swede Production

Seasonal Notes by the Extension Division

THE area of turnips and swedes sown annually is approximately 350,000 acres, and these roots occupy a larger area than any other crop grown in New Zealand. Though most of the area devoted to them is in the Otago and Southland districts, turnips and swedes are also important in other parts of the South Island and also in a large part of the North Island.

GOVERNMENT APPROVED SEED

NEW ZEALAND grown Government approved seed of the following varieties of turnips and swedes is being distributed for sowing in the 1953-54 season:—

Yellow-fleshed Turnips

N.Z. Purple Top Yellow
N.Z. Purple Resistant
N.Z. Waites Eclipse
N.Z. Green Top Yellow
N.Z. Green Resistant
N.Z. Victory Yellow
N.Z. Champion Hybrid

White-fleshed Turnips

N.Z. Green Globe
N.Z. Red Globe
N.Z. Purple Globe
N.Z. York Globe

Swedes

N.Z. Superlative
N.Z. Grandmaster
N.Z. Crimson King
N.Z. Wilhelmsburger
N.Z. Sensation
N.Z. Calder

All lines of Government approved seed being distributed to retailers this year are identified by the letter K branded on the calico packets and have a germination of 88 per cent. or better.

TURNIPS IN NORTH ISLAND

In the North Island white-fleshed or "soft turnips" are a useful crop on dairy farms to provide summer and early-autumn supplementary feed, and their production fits in admirably with a pasture renewal programme, as they leave the land in good condition for early-autumn pasture sowing. A succession of varieties sown in October and November will provide feed from the middle of January to the end of March. The varieties recommended for this purpose are N.Z. Green Globe, N.Z. Purple Globe, and N.Z. Red Globe. Yellow-fleshed turnips are not important in the North Island, as they require the cooler growing conditions of the south. The crop is best drilled in 7in. or 14in. rows with 8 to 12oz. of seed and 3cwt. of serpentine superphosphate per acre. If the seed is broadcast, 1lb. is required with 5 to 6cwt. of phosphatic fertiliser.

—*E. B. GLANVILLE*

* * *

WHITE-FLESHED TURNIPS IN SOUTH ISLAND

N.Z. Green Globe is the best available white-fleshed turnip variety for keeping qualities, as under conditions of reasonable fertility and not too heavy winter rainfall, the bulbs may be expected to keep in good condition for feeding off as late as the end of August. Under these conditions early-maturing swedes have been fed off first and Green Globe used for later-winter feeding. On higher-fertility land flesh collapse is more probable, and consequently in such places this variety of turnip should be grown only for early feeding. N.Z. Purple Globe and N.Z. Red Globe develop more quickly than N.Z. Green Globe, but will not keep as well. Purple Globe and Red Globe are recommended for dry districts and poor types of soil. If sown as early as possible on stubble land, these varieties will provide winter feed, and if sown in the spring as a precaution against dry conditions in late summer and autumn, are useful varieties. These two varieties may be used to advantage on first-furrow land where development is being undertaken. N.Z. York Globe is a very quick-maturing variety of the class formerly known as stubble turnips and is very useful for autumn sowings where earlier sowings have failed or with sowings to pasture. Sowing rates must vary according to the size of seed and the state of cultivation of the paddock and the time of sowing. Suggested rates are from 6 to 10oz. for 24in. ridges, from 8 to 12oz. for 14in. drills, from 10 to 14oz. for 7in. drills, and for broadcasting approximately 1 to 1½lb. per acre; 2 to 2½cwt. per acre of reverted superphosphate should be sown with the seed.

—*R. W. BUSH*

* * *

YELLOW-FLESHED TURNIPS

THE "Aberdeen" types of yellow-fleshed turnips are noted for their hardiness and keeping quality, and consequently their greater use is advantageous where farmers at present rely solely on swedes for late-winter feeding. N.Z. Purple Top Yellow and N.Z. Green Top Yellow are both classified as "Aberdeen" types, being hard and yellow fleshed. Though their production will not match that of the soft yellow turnips, the bulbs are much higher in dry matter content, and they are also superior in keeping quality. Unfortunately they have a tendency to grow well into the ground, this fault being accentuated by thick sowings, which restrict bulb development. Recent selection work, however, has reduced this tendency to some extent. The "Aberdeen" types require a cool climate and are particularly suitable for districts which experience severe frosts, provided the soil fertility is reasonably high. For cases where club root is troublesome two resistant varieties of "Aberdeen" type are available, namely N.Z. Purple Resistant and N.Z. Green Resistant. Other types of yellow-fleshed turnips are softer fleshed than the "Aberdeen" types. They are grown most successfully under somewhat similar conditions, but their growth is more rapid. The bulbs develop larger than those of the harder-fleshed types, but their keeping quality is inferior. The softer-fleshed types are preferred for feeding out to dairy cows in autumn. Varieties of softer yellow-fleshed turnips include:—

N.Z. Waites Eclipse, a purple-topped variety;

N.Z. Victory Yellow, a green-topped variety;

N.Z. Champion Hybrid, a green-topped variety with softer flesh than the other two varieties.

Seeding rates for yellow-fleshed turnips depend on the suitability of the seed-bed and other factors which may affect germination, but a general recommendation is that 6 to 8oz. per acre be used when the seed is being sown in ridges.

—*A. R. RANKIN*

* * *

SWEDES IN NORTH ISLAND

THE area devoted to swede production in the North Island each year exceeds 60,000 acres, of which a good proportion is concentrated in the colder central districts, including the King Country and Rotorua districts. These crops are important in providing winter feed on sheep and cattle farms and on dairy farms. Swedes are used also as a pioneer crop in the breaking in of country that has reverted (as in the King Country) and are commonly used also in the course of replacement of worn-out pastures by new ones. The crop does best on soils that are naturally well drained yet well supplied with moisture in summer and contain a good supply of organic material. Except for the pumice soils, most of the soils of the central area provide these requirements. On pumice soils a period in pasture is necessary for the accumulation of sufficient humus to meet the demands of the swede crop, and sometimes a sowing of Italian ryegrass, red clover, and cocksfoot is established for a few years on raw pumice soils before the sowing of the swede crop and the establishment of permanent pasture.

To an increasing extent, particularly in the more settled districts and where a second crop of winter fodder is required, mixed crops of swedes and chou moellier are being grown. If the swedes fail through disease, chou moellier is relied on to provide a fairly good supply of fodder.

Ploughing for the swede crop should begin about August-September and the land left to lie fallow until about late October, when discing and harrowing can be carried out. The seed may be drilled at about 12oz. per acre with 3cwt. of serpentine superphosphate. If the seed is sown broadcast, about 1lb. is required per acre and heavier applications of fertiliser are also needed. Common varieties grown in the North Island are N.Z. Superlative, N.Z. Grandmaster, and N.Z. Crimson King.

—*C. R. TAYLOR*

* * *

SWEDES IN SOUTH ISLAND

SWEDES are important in South Island farm practice and about 100,000 acres are grown annually. Superlative, Grandmaster, Crimson King, Sensation, Calder, and Wilhelmsburger are the six New Zealand varieties of which Government approved seed is available and which are sufficient for most requirements. Superlative is the earliest maturing and should be fed off first. If kept too late in winter, it is prone to attack from diseases such as dry rot and bacterial soft rot. Grandmaster and Crimson King mature later and should therefore be used for later winter feeding. Sensation is a good keeping swede and may be expected to produce a good crop on lighter land. It is blight resistant and is therefore useful in dry districts where aphis damage may be expected. Calder is a New Zealand variety which was intended primarily for dry conditions; it has, in fact, proved more acceptable on farms in parts of Otago and in Southland. Wilhelmsburger, a green-topped swede, has some resistance to, but is not immune from, club root and may be used for a second crop. The keeping qualities of this variety are extremely good; the flesh is compact and the bulbs are frequently smaller than those of the purple-topped varieties growing under similar conditions. Wilhelmsburger swedes require a long growing period and will produce a useful crop on most soil types provided there is sufficient moisture. They should be fed off last. Ridging is general, but late-sown crops may be put in on the flat. Seeding rates vary according to the state of cultivation and other conditions. About 8 to 12oz. per acre for ridging and 1¼ to 1½lb. per acre on the flat will usually be found sufficient. Sowing in late November or early December is recommended, and the scuffler should be used freely in ridged crops until the leaf growth hampers its use.

—*W. FAITHFUL*

* * *

BORAX FOR BROWN HEART

BROWN heart in swedes may be controlled by applications of borax and treatment should be undertaken wherever borax deficiency is likely to occur. In southern districts 15 to 20lb. per acre of borax (sodium bi-borate) is commonly broadcast a few days before sowing, with fertiliser or a light dressing of lime used as the spreader. Alternatively, with ridged crops, the mixture of borax (5 to 8lb. per acre) and fertiliser is sown through the front sprouts of the ridger. Where, as in the North Island, it is common practice to mix and broadcast seed and fertiliser an application of borax at 8 to 10lb. per acre is given a few days before sowing and with part of the fertiliser used as a spreader. Borated fertilisers are obtainable, and if registered, should contain not more than 2½lb. of sodium bi-borate per 100lb. Not more than 3cwt. per acre of such fertilisers should be applied, as excessive boron may cause severe germination injury. As lime appears incompatible with brown heart control, liming immediately before sowing swedes should be avoided in districts where the disease is prevalent.

—*W. F. LEONARD*

* * *

SPRING PHOSPHATIC TOPDRESSING

THE aim of topdressing is to even out seasonal pasture growth and to increase grass growth in times of grass scarcity rather than in flush periods. Trials have shown that greater total results are secured by topdressing twice annually than by applying the fertiliser at one time. The periods of the year when pasture fails to grow sufficiently for stock requirements are winter, early spring, and summer. Autumn topdressing increases pasture growth in winter and early spring. An early-spring topdressing encourages spring growth and an application in November increases summer growth. The best times therefore for topdressing to even out pasture growth are March-April and November.

In dairy farming where 4cwt. or more of phosphatic fertiliser per acre per annum is applied all the farm can be topdressed in autumn with half the amount and in spring with the remainder. November is a busy time on dairy farms and it is not normally possible to topdress all the grazing area of the farm at this time. However, as much as possible of the area being grazed and particularly the aftermath of silage should be topdressed in November, but hay paddocks are usually harvested too late to obtain any benefit from a similar dressing. New pasture sown in autumn, particularly on virgin soils, should receive an extra dressing of fertiliser in early spring.

On sheep farms the only spring topdressing applicable is that of hay paddocks before closing and paddocks in November for the finishing off of lambs.

—*N. A. CLARKE*

* * *

GRASS-WEED KILLERS

WITH few exceptions the grass-weed killers T.C.A. and I.P.C. have proved highly selective. Apart from their contact action, these chemicals do not adversely affect most species of broad-leafed plants. The contact action of T.C.A. is caused by the caustic nature of the chemical and that of the emulsifiable form of I.P.C. is due to the aromatic solvent employed. The value of I.P.C. lies mainly in its use in crops. T.C.A. has a much wider application, but because both chemicals have a contact action on the foliage of broad-leafed plants, their application to crops must be restricted to pre-emergence treatments. I.P.C. has proved to be more selective to legumes than has T.C.A., but species such as peas and established lucerne show sufficient tolerance to allow the use of T.C.A. in the eradication of grasses in such crops. Potatoes and brassicas show a high tolerance to T.C.A. Spurrey, one of the worst weeds of brassicas in southern crops, is killed with 10 to 20lb. of T.C.A. per acre, and this chemical offers a means of control of this weed in brassica crops.

Grass weeds show different tolerances to T.C.A., those grasses that are most difficult to eradicate by mechanical means being the most susceptible to this chemical. Thus rhizomatous grasses, couch, and various twitches are most susceptible, stoloniferous grasses such as kikuyu and buffalo grass offer more tolerance, and the fibrous-rooted grasses are mainly tolerant. The efficiency of T.C.A. is enhanced by prior cultivation. The most satisfactory method of eradicating weed grasses, particularly in cropping areas, is to plough, apply the T.C.A. to the upturned sod, cultivate, and sow a crop, such as brassicas, tolerant to T.C.A. This method gives excellent control of grass weeds without the need for a lengthy fallow. Seedling annual grasses are killed by light rates of application of T.C.A., these rates causing no damage to established fibrous-rooted perennial grasses. As demonstrated in trial work, annual grasses may be eliminated in pastures without damage to associated grass species of value. Clovers also are not adversely affected by these light dressings.

—*L. J. MATTHEWS*

Pellet Feeding for Poultry Flocks

IN these days of steadily increasing costs of poultry feed full advantage must be taken of modern trends in feeding technique and poultry nutrition, and the introduction of poultry pellets to New Zealand on a commercial scale has prompted J. H. Jones, Poultry Instructor, Department of Agriculture, Christchurch, to comment on this way of feeding the ration to the flock.

THE natural diet of the wild fowl consists of vegetable matter such as herbage, seeds, etc., and of insects and other small animal life. Under wild conditions this suffices for one or two clutches of eggs a year, but domestication has much increased the productivity of poultry. To maintain this without breakdown in health of poultry, food given them must be correspondingly more efficient. In certain systems of management where poultry have little or no access to natural conditions and where egg production, hatching, rearing, and so forth take place at unnatural times of the year nutrition becomes even more important and only by careful feeding based on experience can success be achieved.

The number of eggs a fowl is capable of producing depends on characteristics inherited from its parents, but the quantity it actually produces depends on the management it receives, and one of the main points of good management is correct nutrition.

Up to the present the diet of New Zealand poultry flocks has been wheat supplemented by other grains and mash, wet and dry. Controversy has raged over the wet and dry mash systems, but now that pellets have been introduced both methods are seriously challenged.

In England during and after the war poultry farmers with no area from which to supplement their food supply were forced to use wet mash to be able to eke out their rations with potatoes, processed waste, etc., but when food was more plentiful and wherever the ration would allow it they were much more inclined to use a simpler method of feeding. Dry mash feeding is satisfactory up to a point, but is rather wasteful, and in many ways the introduction of pellets provided a dry feed which did not have the disadvantages of dry mash. Even so when pellets were first brought on to the market about 20 years ago poultry farmers were inclined to be sceptical, and it was some time before they became accepted and used widely.

A firm in Hull first began the manufacture of pellets, and to those who made use of them they quickly proved their value. Pellets have been produced on a limited scale in New Zealand for some time, but it is only within recent months that considerable prominence has been given to use of them and great interest is now being shown in this method of feeding.

Method of Manufacture

Laying pellets consist of layers' mash which is heated and sometimes mixed with a binding agent (molasses) and then forced through dies of ⅜in. diameter from which they emerge in approximately ¼in. lengths suitable for feeding to birds. They should be free from loose mash, though some of English manufacture were far from this. However, this was the exception rather than the rule.

Small pellets suitable for feeding to chicks from day old onward are also being produced. The milling firms found, however, that the high cost of the machinery necessary to produce chick pellets and comparatively small output per hour made production uneconomic. Some firms are now pelleting chick mash into layers' size, breaking these pellets down in a crushing machine, and producing what are known as crumbs or crumbles. Results from this type of feeding appear to be perfectly satisfactory.

Fowls use different senses from those of man in deciding what is or what is not palatable. Smell and taste matter little to the birds, appearance and physical condition being most important. They are attracted by shining, hard objects and they do not appreciate dusty food or a mash of such composition that it will stick to their beaks or swell greatly when mixed with water after consumption. Pellets manufactured from good mash should have all its good qualities made more attractive by the method of presentation.

British Trial

Up to the present no investigational work has been done on pellet feeding in New Zealand and it is doubtful if such work need be done, because of the full trial of this system of feeding in the United Kingdom. The British Oil and Cake Mills (B.O.C.M.) have completed a trial, using laying battery cages, to compare egg production from pellets and mash.

Pullets hatched in late spring were housed at random in battery cages and kept for 48 weeks from the start of lay. Each group of 50 pullets received as nearly as possible identical treatment, except for the alterations in

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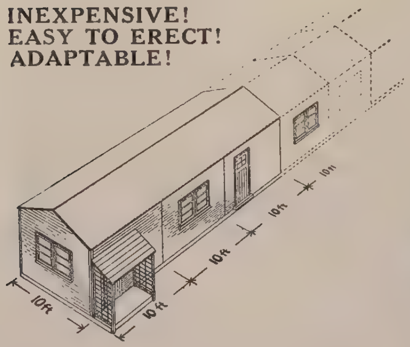

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their diet. Two groups were fed dry mash and pellets respectively ad lib. and another two groups dry mash and pellets respectively restricted to 4½oz. per day.

The factors taken into consideration in assessing results were total egg production, income from eggs less food costs, gross profits, body weights, moulting, and broodiness. In the first two ad lib. groups there was no significant difference in egg production. It was mainly in carcass values that they differed at the end of the period, the birds fed on pellets showing a gain of approximately 1lb. per bird over the group fed dry mash ad lib. In the second two groups, however, there was a great difference in the cash returns, the group receiving 4½oz. of pellets being far superior to that receiving a similar quantity of dry mash. The gross profit was more than double.

To verify the results the experiment was repeated for a second year and the same difference was apparent. Some of the mash was bound to be wasted in the water and it seemed probable that birds fed 4½oz. per day actually would receive only about 4oz., which would be barely sufficient for maintenance. No pellets were wasted and pellets were eaten in an hour after the daily feed.

This experiment was carried out when egg prices in Britain were uniform over the year, but Dr. Blount, the instigator, pointed out that with seasonal variations in egg prices there would be a difference in profit shown between the first two ad lib. groups which was not apparent when the experiment was conducted. The pellets appeared to favour the production of early eggs, which from late-spring-hatched birds meant eggs laid in winter, when egg prices would be highest.

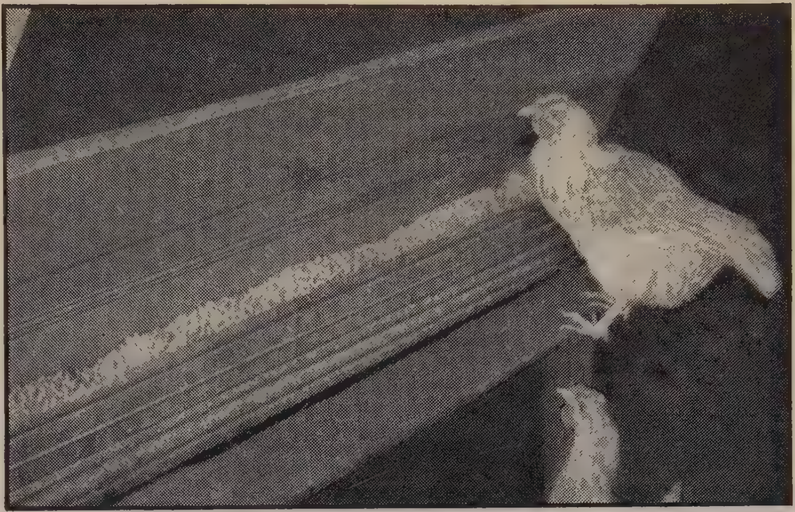
In the pellets ad lib. group, in which the stimulus to egg production was greatest, more eggs over 2¼oz. were produced; in fact the percentage was three times that of the lowest restricted mash group. The percentage of cracked and shell-less eggs was also greater in the pellet ad lib. group, and under other conditions than battery laying cages the tendency to egg eating would be increased.

Less Conclusive Results

Experiments carried out at the National Institute of Poultry Husbandry during a similar period (1947, 1948), also in battery cages, produced less conclusive results. The birds used were 232 six months' old Rhode Island Red x Light Sussex pullets and were divided into 6 groups: Dry mash ad lib., wet mash ad lib., pellets ad lib., dry mash restricted to 4½oz. per day, wet mash restricted to 4½oz. per day, and pellets restricted to 4½oz. per day.

Dr. H. Temperton the investigator commented in his report:—

"Of the birds allowed unrestricted access to the diet those receiving dry mash had the lowest total cost of production per bird, followed by pellets and wet mash. The pellet fed birds produced more eggs than those fed dry mash, but the difference in returns was not sufficient to offset the higher cost of production, the difference in net profit in favour of the dry mash group being 3.2d. per cage. In contrast the wet mash group had the highest production cost and the lowest return, the difference in net profit per cage compared with pellets and dry mash being 8s. 2d. and 8s. 6d. respectively.



Pellets fed in a hopper.

"In this experiment the consumption of pellets in the ad lib. group exceeded the dry mash group by about 12 per cent., whereas in the B.O.C.M. experiment the difference, though negligible, was in the other direction.

"When the amount of food was restricted a reduction in profits resulted in each case, but in the case of pellets the reduction was only half that for dry mash and a quarter of that for wet mash.

"From this experiment it appears that there is little difference in the effects of feeding dry mash or pellets ad lib., but in this instance both were markedly superior to wet mash."

Factors to be Considered

The use of pellets prevents poultry farmers from compounding their own rations and they are unable to vary the diet except by providing meat meal or whatever may be required in a separate trough or hopper. Although manufacturing firms may claim that use of pellets prevents birds from unbalancing their diet by picking out individual ingredients from the mash, it is rarely that such unbalancing occurs or has any serious effect in practice.

Poultry certainly appreciate the palatability of food in pellet form, and during the pullet year, when the birds should be producing heavily, there is little danger of their consuming too great a quantity. However, if the flock includes second- or third-year birds some restriction would be necessary to prevent their becoming overweight.

During the shorter, winter days, when egg prices are highest and the birds require to take in extra food to maintain body temperatures, it would seem that pellets demonstrate their greatest advantage, as the birds are able to take in all their requirements in the shortest possible time.

Pellets may be fed as a morning or evening feed alternating with grain, in which case meat meal would have to be provided in a separate hopper. They also may be used in place of dry mash fed ad lib. Where artificial lighting is used during winter, pellets may be provided as the extra feed, and the hoppers opened in the evening may be closed by the attendant on his first trip round in the morning.

Fish oil may be supplied by mixing it into a small percentage of wheat or other grain, which in turn is mixed with the pellets for trough feeding. Where the system of management is to feed pellets ad lib. the most practical method of supplying fish oil is in grain, which must be trough fed or mixed with greenfeed. Alternatively pellets containing full vitamin requirements for laying stock may be bought.

A disadvantage of pellet feeding may be that birds can fill their crops in a very short period and have time to get into mischief, such as turning their attention to cannibalism or egg eating. Where the diet is somewhat restricted birds become more occupied in scratching about in the litter.

A definite point in favour of feeding pellets is the ease and pleasantness of distributing the feed. Pellets are labour saving and clean and there is very little contamination of litter or water troughs. They are easy to handle during windy weather.

Chick pellets or crumbs are perfectly satisfactory for feeding to chickens in place of their mash ration, and growing pullets may be fed on growers' pellets where these are available. The change to growers' pellets should be made gradually from the time birds reach 6 to 8 weeks of age.

In whatever form food is presented it must be palatable. It must provide no more fibre than is necessary to promote easy passage of food through the alimentary tracts and must furnish sufficient nutrients in correct balance, supplemented with minerals and vitamins, so that not only is the bird maintained in good health, but it is able to produce from raw materials the maximum number of eggs of which it is capable.

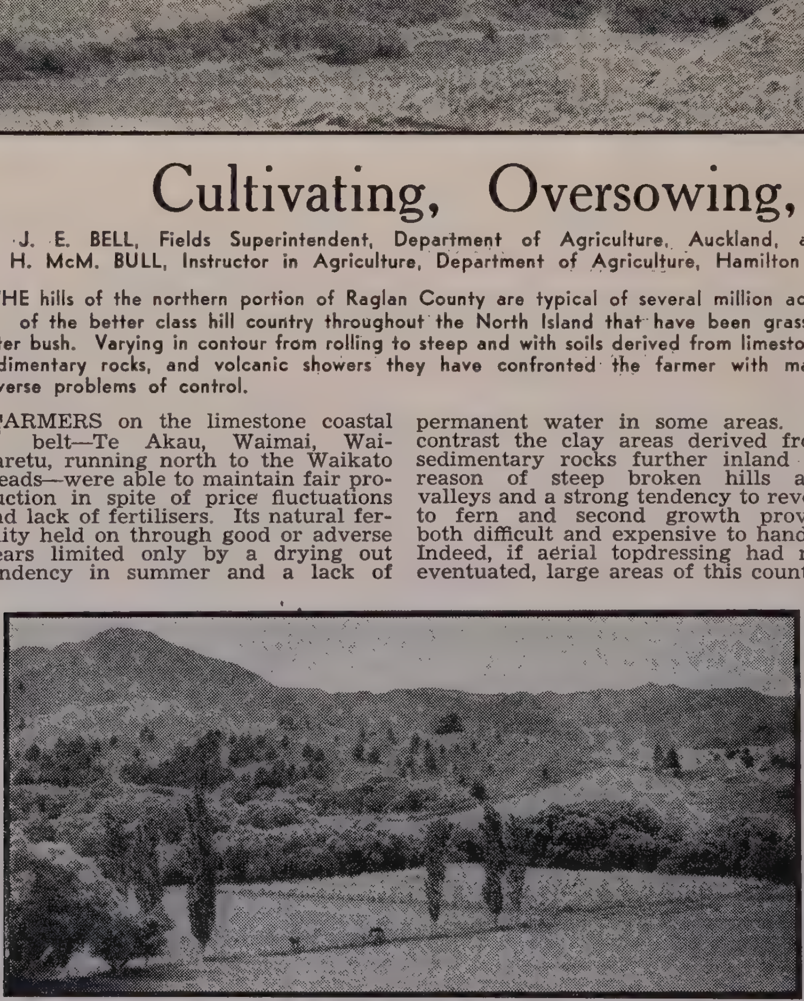
◆

Cultivating, Oversowing, and Topdressing

By J. E. BELL, Fields Superintendent, Department of Agriculture, Auckland, and H. McM. BULL, Instructor in Agriculture, Department of Agriculture, Hamilton

THE hills of the northern portion of Raglan County are typical of several million acres of the better class hill country throughout the North Island that have been grassed after bush. Varying in contour from rolling to steep and with soils derived from limestone, sedimentary rocks, and volcanic showers they have confronted the farmer with many diverse problems of control.

FARMERS on the limestone coastal belt—Te Akau, Waimai, Waikaretu, running north to the Waikato Heads—were able to maintain fair production in spite of price fluctuations and lack of fertilisers. Its natural fertility held on through good or adverse years limited only by a drying out tendency in summer and a lack of permanent water in some areas. In contrast the clay areas derived from sedimentary rocks further inland by reason of steep broken hills and valleys and a strong tendency to revert to fern and second growth proved both difficult and expensive to handle. Indeed, if aerial topdressing had not eventuated, large areas of this country would have reverted to fern with a consequent loss of production of wool and meat.



View of Waingaro Valley. The carrying capacity on the hill area at left was raised from one sheep to three in 8 years through annual applications of 2cwt. of phosphates and liming where possible. The sharp ridges typical of this once poor greywacke country contrast with the softer profile of the better-class limestone country in the heading photograph.

Ploughable Land

The improvement of hill country involves the introduction of better kinds of grasses and clovers and the raising of fertility by topdressing and liming so that these grasses and clovers will establish and grow. The pasture of the poor hills comprises much browntop, danthonia, sweet vernal, and inferior clovers, and these need to be replaced by better grasses and clovers. Much of the land is ploughable and the most speedy and most certain method of improvement is to plough or giant disc such areas in early winter to allow weathering, and then to grow a crop of chou moellier, kale, or swedes preparatory to grassing.

On rush-infested limestone areas two successive crops are often taken to ensure a more effective smother of the natural regrowth. Such winter-fed crops are extremely useful. They enable the pasture to be spelled in May and June so that there is a long enough growth for the cattle to do well in late winter. A mixed crop can be grown, about ½lb. of chou moellier and ¾lb. of swedes per acre with 3cwt. of serpentine superphosphate and up to 1 ton of lime being sown. Chou moellier will stand many diseases that may destroy the swede crop and is a

HEADING PHOTOGRAPH: Panorama of Te Akau, the most fertile hill district in Raglan County. The average carrying capacity per 8 acres is two ewes and replacements with one breeding cow (with calves). The limiting factor is lack of permanent water in summer droughts.

Hill-country Pastures of Northern Raglan

safeguard, particularly after crops of the turnip family. However, to do well chou moellier requires liberal dressings of both lime and phosphates. Therefore on areas not previously cropped, particularly in the raw initial breaking-in stages, swedes are better. The seed is better drilled, although it may be sown broadcast immediately after mixing with the fertiliser. After the crop is eaten off, the area can be reploughed or disced, limed at ½ ton per acre, and prepared for another crop. Soft turnips at 1lb. or rape with 2½lb. of seed and 3cwt. of serpentine superphosphate are popular. Rape, provided it ripens properly, will prove useful in topping off stores and in flushing ewes before tupping.

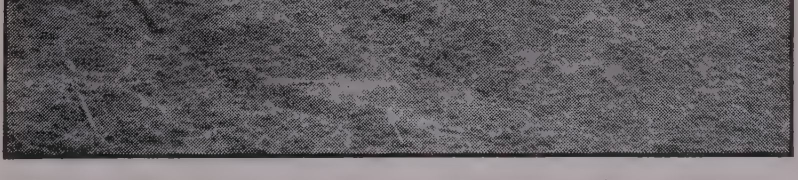
After the crop is removed, the area can be lightly disced, well harrowed, and sown to pasture. Consolidation is vital and when use of a roller is not practical sheep should be herded on to the area before sowing. On very light fluffy soils or ridges liable to blow or scour excellent results have been achieved from broadcasting seed in the remnants of a crop, thus allowing the stock to trample it in when cleaning up a paddock. The following seed mixture should be sown in March:—

	lb.
Certified perennial ryegrass	25
Certified white clover ..	2
Certified red clover ..	3
Certified cocksfoot ..	4
Paspalum	4
Crested dogstail ..	3
Mixed Mt. Barker and Tallarook subterranean clover	3
	—
	44lb. per acre

The heavier soils should be limed at 1 ton per acre before sowing and phosphate applied at 3cwt. per acre on both light and heavy soils. The area should be moderately grazed with sheep throughout winter and given another dressing of 3cwt. of phosphate in early spring. After that annual dressings of phosphate at 3cwt. per acre plus lime every 2 years at 10cwt. or every 4 years at 1 ton, particularly on the heavier soils, will be required.

Land Not Ploughable

On non-ploughable areas or those which will not be ploughed for some time careful examination should be made of the pasture to see what species are present and what require introduction. White clover is the most important and should be introduced if it is not present. *Lotus major* should be introduced in wet areas and very shady faces that are neglected by stock, and subterranean clover should be introduced on dry sunny faces if not already present. The introduction of clover by surface sowing is fairly uncertain and the introduction of grasses is more difficult still. Subterranean clover is more easily established than white clover or *Lotus major*. However, an attempt should be made to introduce clovers not present and if none of the three



Area typical of many acres of hill country, showing strong hold of bracken and hard fern.

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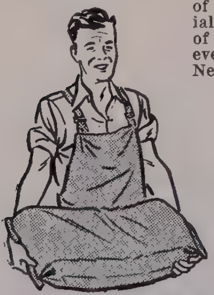

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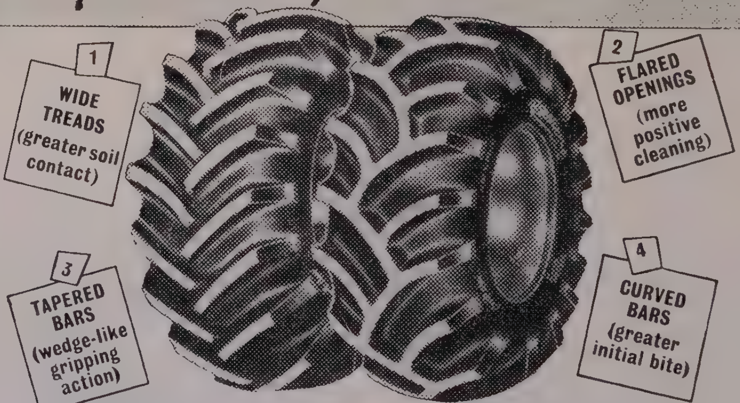
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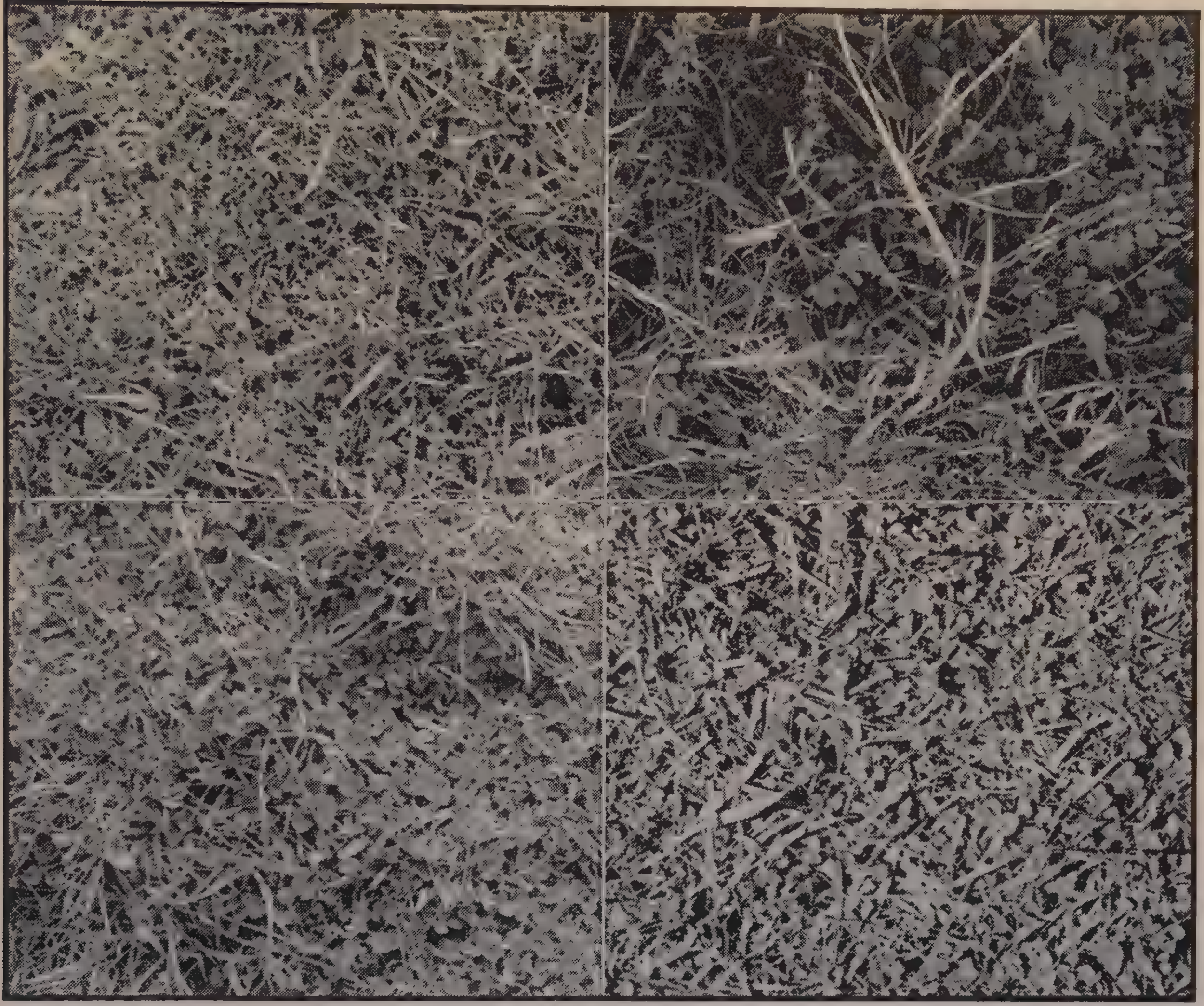


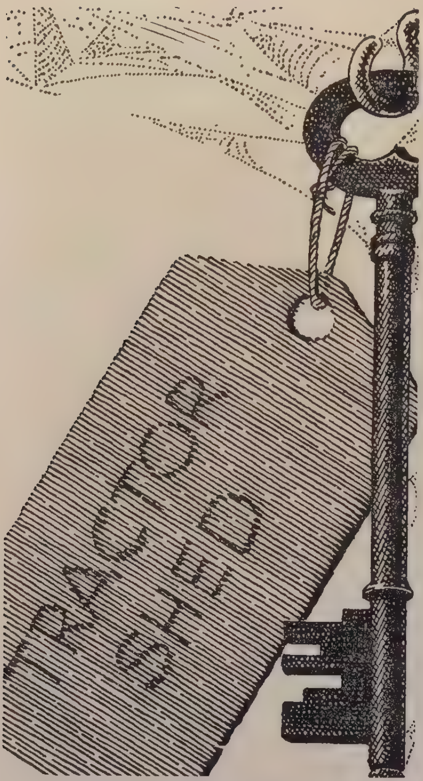
Upper left—No oversowing. Note poor sward through lack of clovers despite five annual applications of serpentine superphosphate at 3cwt. per acre. Upper right—The result of oversowing with *Lotus major* seed at 1lb. per acre and the application of serpentine superphosphate at 1cwt. per acre for 5 consecutive years. Lower left—Strong growth of Tallarook clover sown at 3lb. per acre with five annual applications of 1cwt. of serpentine superphosphate per acre. The lime requirement of this soil was 1 ton and there was a very low phosphate level. Lower right—An excellent sward of Kentish white clover oversown at 2lb. per acre and treated with an initial dressing of 1 ton of lime per acre, followed by five annual applications of 1cwt. of serpentine superphosphate per acre.

species is there, one at least must be introduced if the pastures are to be improved by topdressing and liming. This improvement is best carried out by concentrating on one field at a time, and if operations are begun on one field each year, slow but fairly certain progress can be made.

From trials carried out in Raglan and Kawhia Counties it would appear that the strike of clovers is more certain after dry summers. The pasture is then well eaten down and the seed reaches the soil and is not caught in the foliage. The close mat formed by browntop is particularly difficult to penetrate; therefore the pasture on which the clover is to be established should be well eaten out that summer by concentrating on it cattle and then sheep. The seed is more certain to establish if sown when autumn rains have set in, usually by late March. Sometimes a dry period may follow the sowing and strike of the seed, but this risk is better than delaying sowing until the winter months. The strike may be materially assisted by running sheep in the area to tramp the seed in.

Certified white clover seed should be used at 2lb. per acre, a mixture of Tallarook and Mt. Barker subterranean clover at 3lb., and *Lotus major* at 1lb. On areas liable to continuous close grazing Tallarook subterranean clover has proved superior to Mt. Barker probably because it comes into flower some weeks later, when there is more feed about. Under the same conditions Kentish white clover has proven much superior to Certified white clover because it has lower fertility requirements and because its prostrate nature assists it to survive hard grazing. The object should be, however, not to treat the pasture in this manner.

Sheep are particularly hard on young seedlings, either pulling them out or chewing them off below the crowns. Therefore the block should be spelled or very lightly grazed in April, May, and June, when the young seedlings are coming through and again in November-December, when they are reseeding. Complete control with cattle for 12 months would be ideal. Although the November-December spelling coincides with a strong growth of fern, the value derived from a prolific growth of young seedlings more than compensates for the temporary roughage which can be controlled with cattle the following winter.



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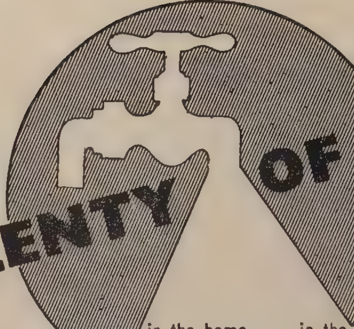

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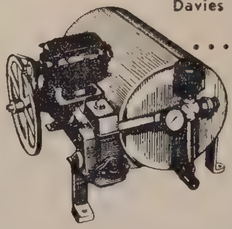

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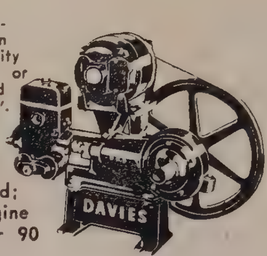

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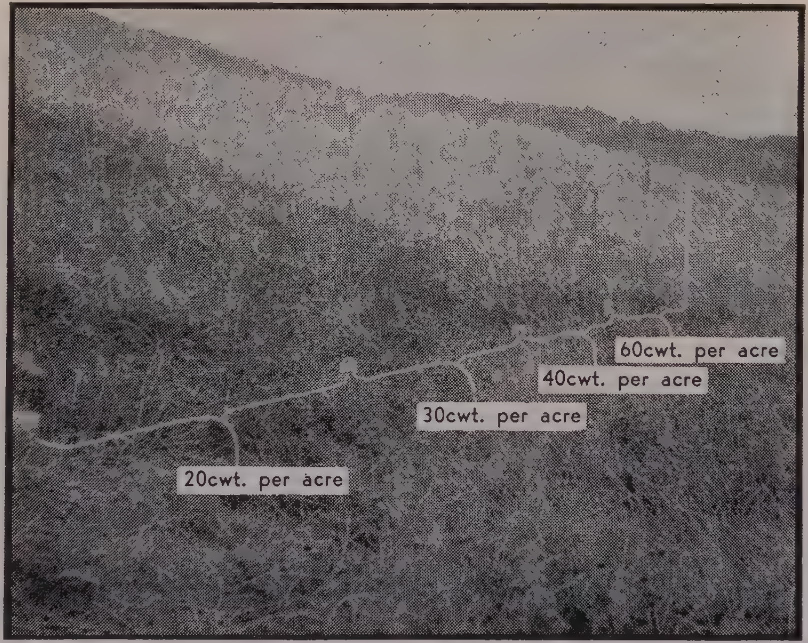
Hoggets on swedes. After the crop is eaten off, the area can be reploughed or disced, limed at ½ ton per acre, and prepared for another crop.

Before a programme of oversowing on the harder hill country is embarked on some understanding of the fertility requirements of the various clovers is essential. White clover should not be sown until the fertility level is built up. On heavy soils liming is essential to obtain results from serpentine superphosphate or other superphosphate combinations. On light soils though application of lime is advisable, serpentine superphosphate or other superphosphate compounds will give worthwhile results without lime. The blower is about the only means of applying lime and it can also be used to sow North African phosphate and basic slag. The blower does not spread the fertiliser or lime evenly, but by using all points of vantage and favourable wind currents, it will get the material on and give some kind of cover. Serpentine superphosphate can be sown satisfactorily by air and the seed can be mixed with this fertiliser just before sowing. At least 3cwt. of phosphate should be applied per acre with the seed. The following autumn it should receive another dressing of fertiliser and if the seed strike has not been satisfactory, another sowing of seed. Subsequent dressings of fertiliser and lime can be made according to finance available, but at least 2cwt. of phosphate every year or 4cwt. every 2 years should be applied, 2cwt. every year being preferable. Lime should be applied up to an optimum of about 1 ton every 4 years on the heavier soils. The value of molybdenum in this country is now under investigation and its use may ultimately assist in bringing in certain areas more rapidly and with smaller dressings of lime than at present appear necessary. Farmers are, however, advised to consult the local Instructor in Agriculture before applying molybdenum on all but small trial areas. Rates of application should in no case exceed 2½oz. of sodium molybdate per acre.

If one block at a time is concentrated on, the established clovers are well fed and thrive and in time the better grasses, ryegrass and crested dogstail, will come in on their own. Obviously on very steep areas the building up process will take longer, as the surface is cut up by sheep tracks to form a succession of steps. The grazing animal forages on the upright faces and the dung and urine are dropped on the steps or stock tracks. On these upright faces moss and danthonia persist through free drainage and the non-return of nutrients from the animal. However, even these difficult areas will succumb in time to proper management. Cocksfoot will increase if the grazing is lax enough; that is, under continuous cattle grazing. If these pastures are as well treated as lowland pastures and clovers are present, there should be



The effects of different rates of lime compared with surrounding area untreated by lime. Seed heads are mostly browntop with some ryegrass and a fair amount of white clover throughout. The field was crushed out of scrub up to 15ft. high with tracklaying tractor and giant discs in 1951. It was fired and disced up and then worked down for a crop of swedes with 3cwt. of phosphates. It was redisced in autumn 1952 and sown down to grass with 3cwt. of phosphate. A further dressing of 3cwt. of phosphate was applied in August, followed by a further topdressing of 3cwt. in October instead of the normal autumn application in 1953. No lime had been applied throughout operations.

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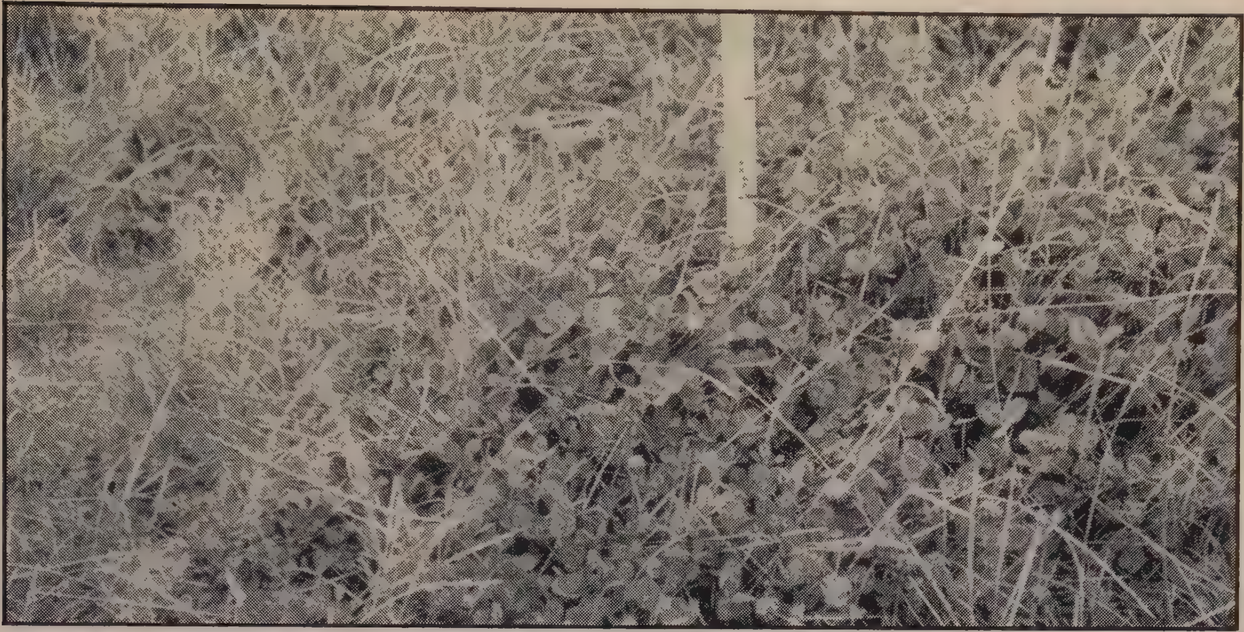

Right—The effect of lime at 20cwt. per acre on Raglan hill country. Left—Control.

nothing to stop hill country of this district eventually carrying 3 sheep and cattle to the acre. Once the clovers establish in the first year the block can be grazed more severely, but improvements will not be readily attained unless the pasture is permitted to grow and is not constantly subjected to hard grazing.

Secondary Burns

Areas of second growth, manuka, and other scrub can be cut and burnt and seed sown on the burn. If the scrub is heavy, it can be cut about November ready for burning and sowing in autumn. Light scrub is better left for cutting until later and about 6 weeks before burning. If the scrub is cut too soon, it will lose its leaves, a clean burn will not be obtained, and there will be less ash for the seed-bed. Generally, areas of light scrub which will dry out easily are better fired as late as possible to catch the autumn rains. The burn will not be subjected to the baking effects of the sun and the tender seedlings will have more chance to survive. The burnt area should be limed and topdressed as for oversowing to enable the grass sward to thicken up and cover the ground to prevent manuka and other weeds re-establishing. The pasture mixture would be approximately as follows, although more seed could be sown with advantage:—

	lb.
Certified perennial ryegrass ..	8
Crested dogstail	3
Cocksfoot (on good burns) ..	4
Browntop (where fertility is not high)	3
Danthonia pilosa (where not present)	2
Certified white clover	2
Mt. Barker and Tallarook subterranean clover	3
Lotus major	½

Cocksfoot is possibly better omitted when the ash is sparse.

If the area is to be well treated, browntop and danthonia may be omitted and the ryegrass increased. Danthonia may also be omitted if it is already present and the fire has not been intense. As in all sowings the purity and germination of the seed should be ascertained and allowances made for poor germination and low purity.

The new burn should be treated as a new pasture and not grazed hard in the following winter. Often only patches of fields are burnt and sown and sheep congregate on these patches, eating the newly sown pasture close to the ground, thus not giving it a chance. Fields containing new burns, however small, should be grazed with cattle for the first 12 months and the whole of the remainder of the area should be oversown where needed and well topdressed to encourage stock to graze the block more evenly. If the strike is poor, the area should be permitted to seed in the following summer to thicken the sward. In a burn two bad errors must be avoided. Standing scrub which intensifies the growth of seedlings should not be fired nor should fern be set off in winter or spring. Regrowth in late spring will be almost uncontrollable, it will smother all growth underneath it, and will have no "body" to carry a fire for a year or two to come.

General Improvement

Though it is desirable to concentrate on small areas at a time, the over-all management of a farm should not be sacrificed. Old fences must be kept in good repair if blocks are to be handled successfully, new subdivisions must be erected to keep pace with pasture improvement, and oversowing where needed, and topdressing must be done. All these general improvements must not be allowed to lapse in favour of a too intensive programme of development in one particular area. When the area is being chosen land should be selected which will give the quickest return for the money expended. If it is ploughable, an obvious choice is the easiest and most compact area that can be found. If it is not ploughable, an area with the most promising pasture carrying the least fern and scrub and with a warm sunny aspect should be chosen. Some of the soils in this district are so acid that they will not respond well to serpentine superphosphate and are therefore slow to improve with aerial topdressing. On these soils basic slag and North African phosphate are worth consideration if the financial position permits, particularly should liming not be feasible. There are, however, areas of soil which are usually brown and of a lighter texture and these usually do not need so much lime. Here, fair results can be secured with serpentine superphosphate, even though better results may be obtained from basic slag, North African phosphate, or serpentine superphosphate and lime.

Before money is spent on aerial topdressing farmers should put down small trials here and there, in which possible alternatives to serpentine superphosphate are tried. Thus they could try out 4cwt. of serpentine superphosphate versus 2½cwt. of basic slag or North African phosphate or 2cwt. of serpentine superphosphate and 8cwt. of lime, or at comparable rates at which these materials can be bought, carted, and applied by aeroplane or blower. In studying the results it is well to keep in mind the better distribution and ease of application by air. However, it is not worth distributing by air materials which will not result in a worthwhile improvement of the sward.

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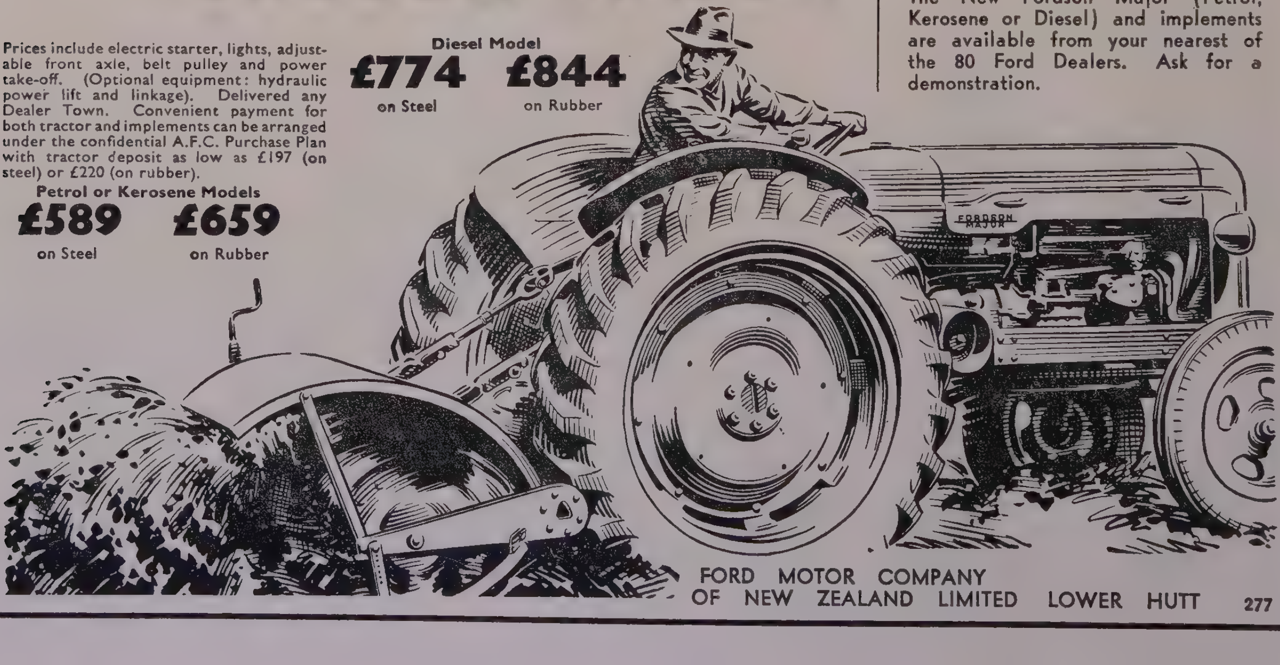

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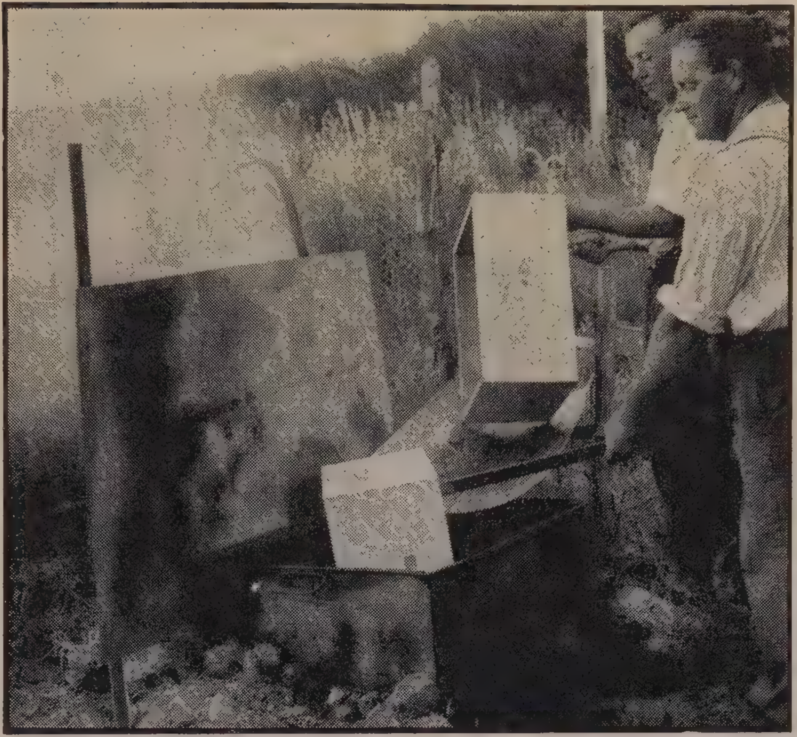
Preserving Hive Parts with Paraffin Wax

By S. LINE, Apiary Instructor, Department of Agriculture, Invercargill

THE preserving of timber by some means that is neither very costly nor offensive to the eye and yet will ensure durability seriously concerns every beekeeper with more than a few hives. The type of coating requires some forethought, because any change to another type of preservative or paint means having hives of odd coloured material, and sometimes it is unsatisfactory to apply a new substance to previously treated timber.

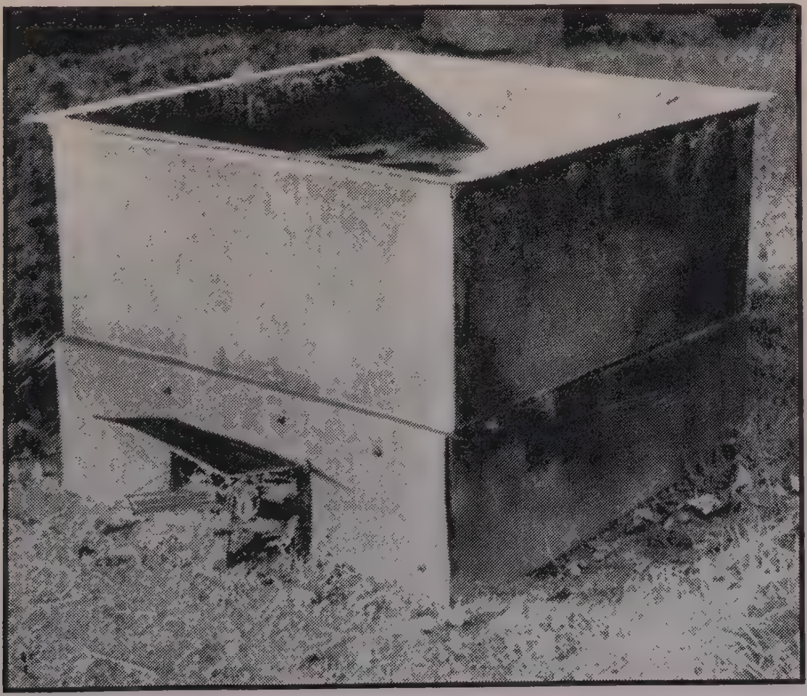
AS most of the wood available today is less durable than that obtainable in earlier years, a good preservative is required. Where hives are in such numbers that they are regarded as part of an industry or plant there is little time for brushing on an expensive paint merely for artistic reasons, but at the same time an apiary which gives a poor impression and has a drab and unattractive appearance becomes a poor advertisement and can have a depressing effect. In addition, it sometimes will not get the same attention as one which has a more pleasing appearance.



Hive parts being dipped in paraffin wax and drained. A protective shield may be seen at the back of the trough.

Use of Wood-stain

Hive boxes dipped in paraffin wax develop a blotchy shade varying from yellow, to grey, to brown, and if the wood could be stained with some pigment that could be quickly brushed on before dipping, the general effect would be better. Each beekeeper will have his own idea as to what is an attractive or tidy colour for hives, and once a colour is decided on experiments would be worth while to find a pigment that could be diluted with either water or turpentine and quickly brushed or sprayed on to supers arranged in columns to present a large working surface. A uniform brown colour could be easily obtained by the application of a wash of creosote before dipping. Creosote is sold at from upwards of 9d. per gallon in bulk.



A waxing tank 4ft. square mounted over an iron fire box.

After the wood has stood for 2 days to allow the stain to dry in, the supers can be dipped in hot paraffin wax and no further odour will be present. Creosote should not be used alone on wooden hive parts as the odour from it is inclined to taint badly any honey subsequently stored in the hives. There are several brown wood-stains used in furniture work that may also be used, and a water-stain can be made quickly by stirring into 1 quart of water 2 teaspoonfuls of condy's crystals (potassium permanganate), which until it dries looks red, but soon changes to a pleasing brown. There is also a green branding ink obtainable which can be considerably diluted, and a blue stain is marketed by a petroleum company.

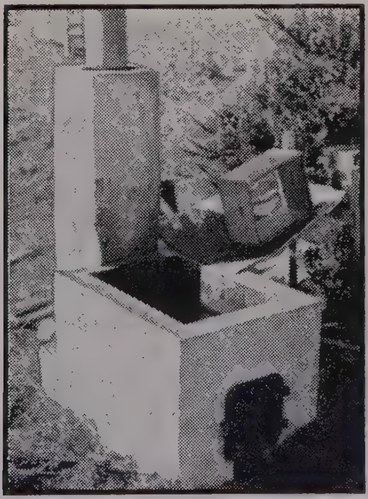
The water-stains and the creosote remain fixed and do not change when immersed in hot wax. Timber that is to be dipped in paraffin wax should be reasonably dry, for if moisture is imprisoned within the joints of bottom boards or within the wood, it can start

An apiary in Southland subjected to summer heat and winter snows. The supers shown were treated with paraffin wax 20 years ago and are still in good condition.

dry rot. Wood from the mills is often wet, and boards should be arranged so that there is air space between them, but they should not be placed in strong sunlight.

Many beekeepers today have a hot-room for warming honey, and this may be used as a quick means of drying moisture out of supers that are to be treated with paraffin wax. The hot-room should not in this case be tightly closed, as the moisture laden air needs to escape. A fungus may develop on the timber if this is not done.

The type of trough to be used should be large enough to hold 2 or 3 supers resting on their sides in about 4in. of hot wax. If the trough is large enough, each super can be revolved from one side to the next, each side being soaked for about 10 seconds before turning, and no time is wasted. The trough itself should be of heavy iron and riveted wherever there is to be a joint, as solder would not stand up to the heat. If the trough is raised from the ground by bricks 6in. to 9in. high, the fire will be effective, but the dipping should be in a sheltered place so that supers lifted from the hot liquid on to a sloping sheet of tin will be able to drain without the wax congealing on the surface and leaving the wood greasy or slippery. Only a warm, sunny day should be chosen for the dipping of hive parts in paraffin wax. As a precaution against the fire getting out of control some wet sacks should be kept nearby ready for instant use. Where a metal trough is built into concrete great heat is easily attained and the fire is always completely under control. Paraffin wax is obtainable from the main petroleum stores at from 8½d. to 9½d. per pound in bag lots or in greater quantities.



A wax trough surrounded by concrete and over a fire box. At right is a treated super draining on a sheet of iron.

Because the boiling point of paraffin wax (about 680 degrees F.) is much higher than is normally required for sterilising, it is suitable for re-dipping supers and bottom boards that have been contaminated with foul-brood. At approximately 316 degrees F. white vapour rises from the surface of the wax, and this is a suitable temperature for immersing wood, but when supers have been in contact with foul-brood they should remain 10 minutes in the trough. A new super absorbs about ½lb. of wax, but where supers are re-dipped for sterilising very little wax is absorbed. Care should be taken not to heat the wax to near burning point, as at this temperature vapour is given off which may ignite if it comes near a naked flame. However, when supers are dipped and drained under really hot conditions so that they drain to look quite dry there should be no trouble with them slipping when placed above each other as hives. Also they could be painted later with an aluminium paint (containing a bitumin base) if the apiary was to be near a railway line or where there was a possibility of grass or scrub fires.

In Southland supers dipped in hot wax 20 years ago are still sound and have warped less than those treated with the more conventional paints.

Show Dates

THE following are dates and venues of A. and P. shows to the middle of January:—

NORTH ISLAND

October

16 and 17 October—Poverty Bay A. and P. at Gisborne.
21 and 22 October—Hawkes Bay A. and P. at Hastings.
*29, 30, and 31 October—Waikato A. and P. at Hamilton.
30 and 31 October—Wairarapa and East Coast A. and P. at Carterton.

November

*6 and 7 November—Manawatu and West Coast A. and P. at Palmerston North.
7 November—Tokoroa A. and P. at Tokoroa.
11 November—Thames Valley A., P., and H. at Te Aroha.
13 and 14 November—Whangarei A. and P. at Whangarei.
*13 and 14 November—Wanganui A. and P. at Wanganui.
14 November—Waihi A. and P. at Waihi.
*20 and 21 November—Egmont A. and P. at Hawera.
21 November—Bay of Islands P. and I. at Waimate North.
26, 27, and 28 November—Auckland Metropolitan A. and P. at Auckland.
27 and 28 November—Stratford A. and P. at Stratford.
*28 November—Kaikohe A., P., and H. at Kaikohe.

December

*5 December—Helensville A. and P. at Helensville.
5 December—Hauraki A. and P. at Paeroa.

January

1 January—Nuhaka A. and P. at Nuhaka.
4 and 5 January—Rotorua A. and P. at Rotorua.
*15 and 16 January—Wairoa County A. and P. at Wairoa.
16 January—Marton District A. and P. at Marton.

SOUTH ISLAND

October

*17 October—Ellesmere A. and P. at Leeston.
*23 and 24 October—Marlborough A. and P. at Blenheim.
24 October—Northern A. and P. at Rangiora.
31 October—Amberley A. and P. at Amberley.
*31 October—Timaru A. and P. at Timaru.

November

5 November—Ashburton A. and P. at Ashburton.
*11, 12, and 13 November—Canterbury A. and P. at Christchurch.
*18 November—North Otago A. and P. at Oamaru.
20 and 21 November—Nelson A. and P. at Nelson.
21 November—Waimate A. and P. at Waimate.
21 November—West Otago A. and P. at Kelso.
21 November—Taieri Agricultural Society at Outram.
24 and 25 November—Otago A. and P. at Dunedin.
28 November—Motueka A. and P. at Motueka.
28 November—South Otago A. and P. at Balclutha.

December

1 and 2 December—Gore A. and P. at Gore.
5 December—Tokomairiro A. and P. at Milton.
5 December—Wyndham A. and P. at Wyndham.
12 December—Otago Peninsula A. and P. at Portobello.

January

9 January—Blueskin A. and P. at Waitati.
16 January—Waikouaiti A. and P. at Waikouaiti.

* The Department of Agriculture exhibit will be staged at this show.

Seed Testing: Basic Features, Services, and Terminology

By G. R. MOSS, Fields Instructor, Department of Agriculture Seed Testing Station, Palmerston North

SEED testing is growing in importance in New Zealand. It is therefore essential for farmers and merchants to understand the basic features, the services available, and the terminology used in seed testing. The relative values of up to £6,000,000 worth of seed grown annually in New Zealand are determined on tests made at the Department of Agriculture Seed Testing Station, Palmerston North, before the seed is sold and sown. Of this quantity almost half is exported to various British and other overseas countries, the remainder being used locally.

Pre-harvest tests are available to farmers to assist in successful harvesting of ryegrass seed. Samples are taken by the farmer from his crop and sent in for a microscopic examination to establish the degree of infection of disease.

THE progressive farmer in New Zealand refuses to buy seed without the guarantee of quality that is given by a certificate of analysis. He knows that the man who uses the best information available to assist him with his cropping and who uses the best equipment and machinery to work his land is very foolish to sow seed of unknown quality. New Zealand's seed industry depends on the work of the Seed Testing Station for reliable information on seed quality.

Seed samples which arrive for testing may have been drawn from the lines they represent by a Departmental officer, a merchant, or a farmer. All agricultural and horticultural seeds are represented in the samples received at the Station. The cost per test when the result is reported in certificate form is 5s. for a single test or 10s. for both purity and germination tests. Samples from farmers, who generally require a test only for guidance in their own farming operations, are tested without charge if the result is not required in certificate form.

Purity Analysis

When the sample is to be subjected to more than one type of test the purity analysis is undertaken first. A working sample is weighed out from the bulk sample received by the Station and examined seed by seed. Anything in the working sample which is not a seed of the line the sample purports to be is put to one side and is classified into one of three groups—other crop seeds, weed seeds, and inert matter. Each group is weighed separately and the result expressed as a percentage of the working sample.

The pure seed as determined by the analyst is the type under consideration regardless of whether it is shrivelled, cracked, or otherwise injured, so long as any broken seed is in size equivalent to more than half a normal seed. Smaller pieces are classed as inert matter.

Other crop seeds are seeds of types of cultivated plants other than those of the sample being examined.

Weed seeds are the seeds of plants recognised by common usage as weeds. There is, however, no universally accepted distinction between weed seeds and crop seeds, since the same plant species may be regarded as a harmful weed in one place and as a useful crop plant in another.

Inert matter is usually composed of small pieces of straw, chaff, dirt, and insects, other particles, and pieces of broken seed of the kind under consideration that are smaller than half a normal seed.

Weed seeds are often not evident when seed is viewed in bulk, but careful laboratory examination immediately reveals harmful species.

All the impurities are identified and listed on the certificate issued. Botanical names are used for all seeds. The use of these is essential to avoid the confusion caused by common names, which differ from place to place both in this country and overseas. Both the botanical names and the common names of noxious weeds such as Californian thistle, ragwort, ox-eye daisy, and others are clearly shown, with the estimated number of these weed seeds present in each ounce of the sample. A list of common and botanical seed names has been drawn up to help in the identification of the names given, and copies are obtainable free from the Seed Testing Station.

Germination Tests

For the germination test each type of seed is given optimum conditions of temperature, moisture, air, and light, the combination of these varying according to the seed species. The aim is to get the maximum germination possible under ideal conditions. Seed of white clover is germinated for 7 days at a day temperature of 20

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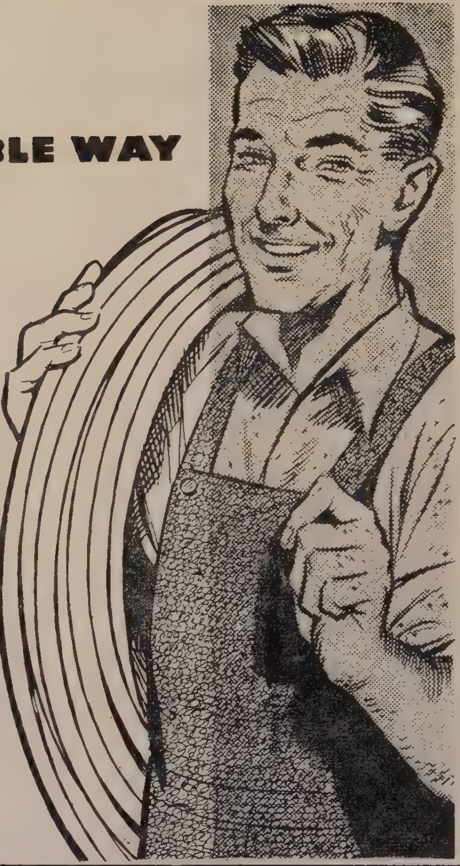

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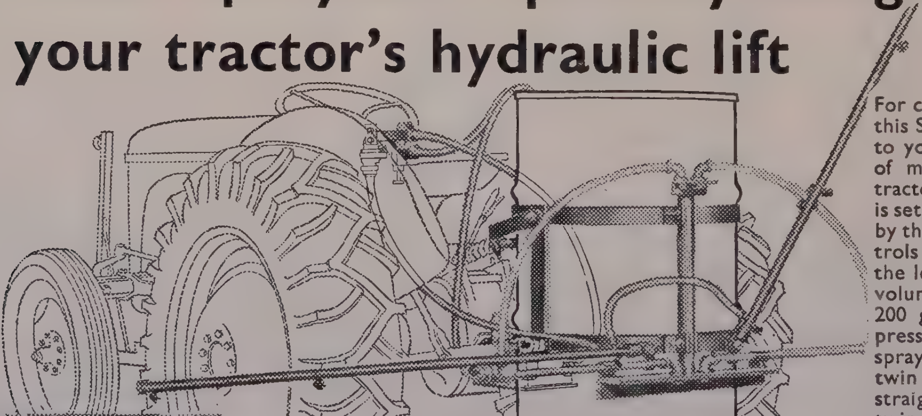

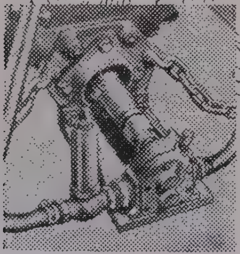

Showing how easily the Stantox spray unit is mounted on your Ferguson. The pump bracket, holding the pump and filter, is fitted to the lower studs as illustrated. Slide the flexible coupling on the p.t.o. shaft, attach the two hose clips, and the unit is ready to operate.

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Manufactured by J. H. Barbour & Son Ltd., Wellington.

BOOM SPRAYERS FOR FERGUSON TRACTORS

Counts being carried out in the germination laboratory. It is essential to know the exact germination when buying or sowing seed.

degrees C. and a night temperature of 18 degrees C. Seeds like browntop require a higher light intensity, a longer period for full germination, and a temperature up to 30 degrees C. The seeds are germinated on filter paper squares.

On the purity and germination certificate such terms as interim counts, hard seeds, and abnormal growths are found which are in general use for all germination work.

The interim germination count is the total number of seedlings which germinate at an early stage of the test. This interim or first count indicates speed of germination and is a better guide to the value of the seed than the final germination figure, as it gives an indication of the vigour of the line. A low interim count followed by a high final count is often an indication that the germination of a line is beginning to fall because of age.

Hard seeds occur in clovers and allied legumes. A hard seed is a seed with an outer coat which is impervious to water and will not germinate until this is broken down by some natural or mechanical means. In one Departmental trial it was found that practically all the seeds in a sample rubbed out by hand were hard, but during mechanical threshing abrasion of the seed coats occurred and then most of the seed germinated. Machine dressing will further reduce the proportion of hard seeds and increase the germination of the line. When hard seeds are sown most of them will germinate after a time, as the seed coats become permeable to water through the action of soil water, abrasion, and temperature changes. Experimentally it has been shown that in the soil within a reasonable time about half of the hard seeds of red clover will germinate, all hard seeds in lucerne should germinate, and about one-third of the hard seeds in all other clovers, including white clover, alsike, and subterranean clover, should germinate.

Abnormal growths arise from seeds which germinate in the laboratory, but lack the power to survive in the soil. Many abnormal growths are seedlings with glassy or broken roots. Many lack the root hairs which are so essential to the uptake of plant foods from the soil. A higher incidence of abnormal growth is found in lines which have been harvested out of condition. Trials have shown that the setting of the header harvester is an important factor affecting the percentage of abnormal seeds in red clover, but is of less importance with white clover. This is probably because white clover is usually in better condition when threshed. Damage also occurs in the field before harvesting, probably as a result of insect attack. Machine dressing does not increase the number of abnormal seeds to any extent in red clover.

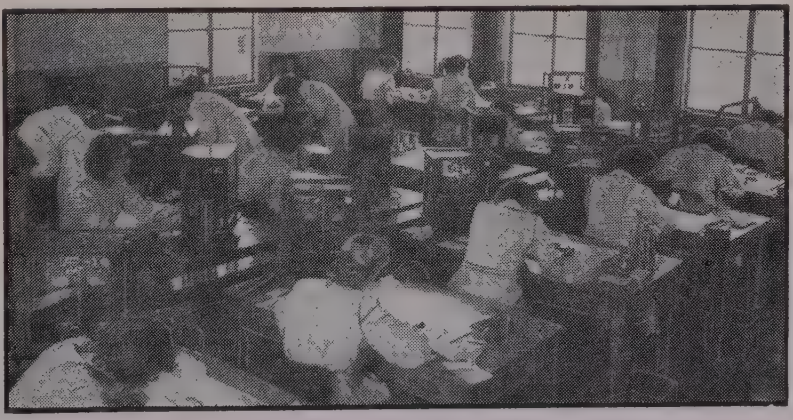
Dormancy in seeds is a general term applied to any condition which prevents living seeds from germinating when the ordinary requirements of moisture and temperature have been met. Particularly with header harvested seeds, freshly harvested seed though quite dry is not fully matured and as a result a proportion will not germinate. These seeds will mature during storage and as a result a higher germination test may be obtained on the line some little time after harvesting. With pasture seeds and most cereals the percentage of dormant seeds is not often high and the condition does not persist long enough to slow up germination in the field; by the time the seed is to be sown it is fully mature and will give its maximum germination under optimum conditions. The best known exception is Algerian oats, the seed of which will not give a satisfactory field establishment in the first autumn after harvest. When a freshly harvested line of seed germinates poorly it is important to know whether dormancy or some other factor is the cause. When dormancy is suspected in seed tested for germination shortly after harvest the seed is subjected to further tests. Sometimes a chemical tetrazolium test is used. Should the tetrazolium test and the normal germination test not correspond dormancy is indicated, and suitable measures are taken to rectify it. Dormancy can generally be broken by pre-chilling the seed in a wet condition in a refrigerator for a short period, though sometimes, as with browntop or paspalum, soaking in a chemical solution such as dilute potassium nitrate may be necessary. After such treatment maximum germination is obtained under normal laboratory conditions.

Strain Testing

Many people find it hard to believe that just as there are different strains of animals within a breed, so too there are different strains within a grass or clover crop. Usually it is necessary to grow the plant in plots or rows so that comparisons of strain may be made, but at the Seed Testing Station two laboratory tests are used to distinguish between different strains of white clover and perennial ryegrass.

With white clover the P.A. or picric acid test is used to distinguish between the vigorous, desirable leafy type and the poor, less desirable type of plant. The laboratory test consists of placing germinated seedlings into a test tube with a strip of yellow picric acid paper. The tubes are then incubated in an oven for 48 hours, after which they are graded according to the colour of the paper strips, the darker orange-brown indicating the better strain.

The U.V. or ultra-violet light test is used to distinguish truly perennial



The purity laboratory at the Seed Testing Station, Palmerston North, where highly trained seed analysts examine samples of seed for impurities.

FROM A FARMER—

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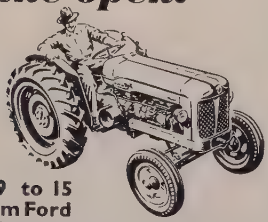

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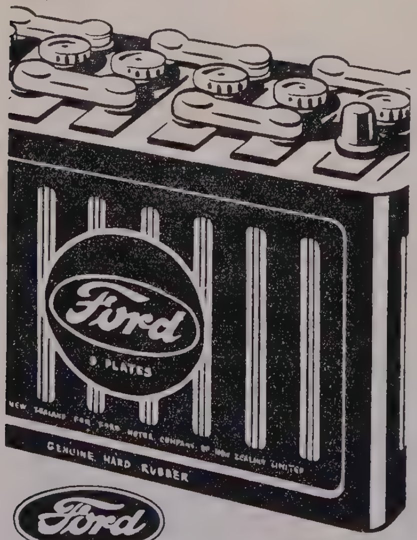
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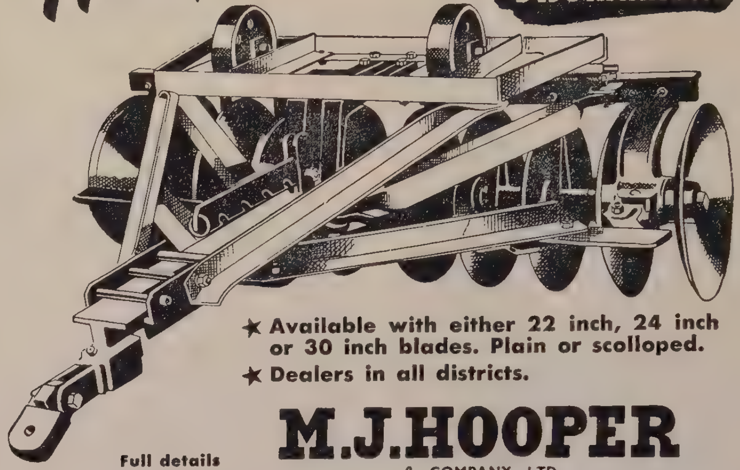

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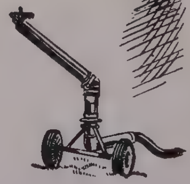

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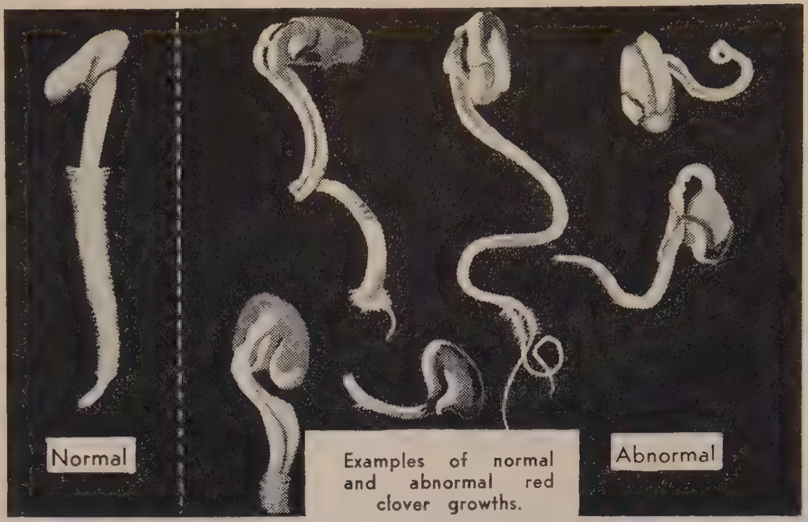
strains of ryegrass from the shorter-lived strains of ryegrass. A ryegrass sample is germinated for 10 days on blotting paper. It is then placed under the ultra-violet lamp. The shorter-lived strains of ryegrass occurring in New Zealand, including Italian ryegrass and short-rotation ryegrass, all show a high percentage of seedlings having a characteristic blue fluorescing light round the roots when placed under the lamp. The truly perennial strains give no reaction.

These tests are used almost entirely as an aid to the certification of perennial ryegrass and white clover seeds, their feature being that the result is obtained within a fortnight whereas a plot test with living plants takes many months.

Comparing Lines of Seed

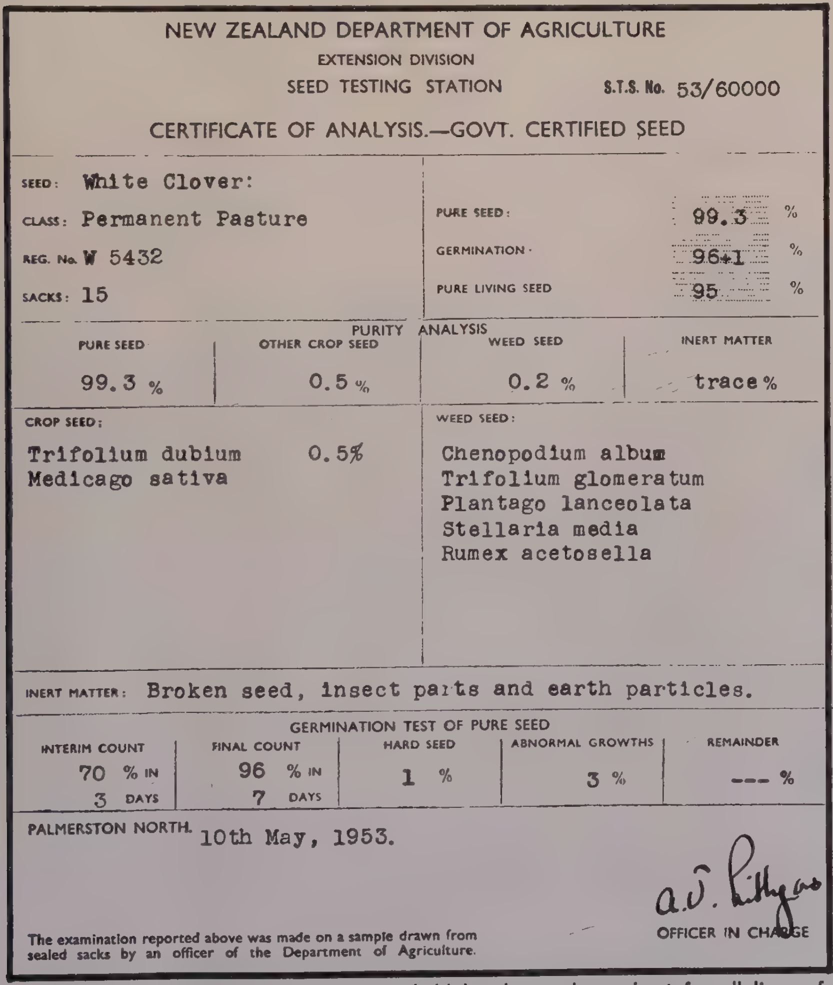
The farmer at some stage may be faced with the dilemma of choosing between two samples of seed equally attractive and of identical strain, but in one of which the purity is low and the germination is high; and in the other both figures are intermediate or reversed. How may such samples be compared?

The most useful figure for comparison is that known as the pure living seed content, which is found at the top right-hand corner of the certificate of analysis. It has been obtained by expressing the product of the purity and the germination as a percentage of the line and is a measure of the amount of pure seed in the line which will germinate. By dividing the cost per bushel or per pound by this figure a cost per unit of pure living seed with which to compare other lines may be obtained. For example, a line of seed at 22s. per bushel having a pure living seed content of 88 per cent. has a unit cost of 3d. A second line at 28s. per bushel with a pure living seed content of 96 per cent. would have a unit cost of 3½d. The 22s. line would be the better buy.



Examples of normal and abnormal red clover growths.

Abnormal growths are seedlings which are found in the laboratory germination tests but which would not survive in the soil. A wise farmer examines the certificate of analysis held by his merchant to find the percentage of abnormal growths.



NEW ZEALAND DEPARTMENT OF AGRICULTURE
EXTENSION DIVISION
SEED TESTING STATION S.T.S. No. 53/60000

CERTIFICATE OF ANALYSIS.—GOVT. CERTIFIED SEED

SEED: White Clover:
CLASS: Permanent Pasture
REG. No. W 5432
SACKS: 15

PURE SEED: 99.3 %
GERMINATION: 96+1 %
PURE LIVING SEED 95 %

PURITY ANALYSIS

PURE SEED	OTHER CROP SEED	WEED SEED	INERT MATTER
99.3 %	0.5 %	0.2 %	trace %

CROP SEED:
Trifolium dubium 0.5%
Medicago sativa

WEED SEED:
Chenopodium album
Trifolium glomeratum
Plantago lanceolata
Stellaria media
Rumex acetosella

INERT MATTER: Broken seed, insect parts and earth particles.

GERMINATION TEST OF PURE SEED

INTERIM COUNT	FINAL COUNT	HARD SEED	ABNORMAL GROWTHS	REMAINDER
70 % IN 3 DAYS	96 % IN 7 DAYS	1 %	3 %	--- %

PALMERSTON NORTH. 10th May, 1953.

OFFICER IN CHARGE

The examination reported above was made on a sample drawn from sealed sacks by an officer of the Department of Agriculture.

This purity and germination certificate is held by the seed merchant for all lines of Certified seed. It should be seen before seed is bought.

Pre-harvest Tests

Pre-harvest tests are available to farmers to assist in the successful harvesting of ryegrass seed and wheat. Seeding ryegrass crops are very subject to attack by blind seed disease (*Phialea temulenta*) which kills infected seeds and lowers the germination of the line. During December and January each year a blind seed service is provided in Palmerston North and a sub-station is established at the office of the Department of Agriculture in Timaru for the pre-harvest examination of ryegrass for blind seed disease. Samples are taken by the farmer from his crop and sent in for a binocular microscope examination by trained seed analysts to establish the degree of infestation of the disease. This service spares the grower the labour and expense of harvesting crops which have been so seriously affected by the disease that they are capable of producing only seed of low germination.

In the direct heading of wheat it is very important that the moisture content of the grain is sufficiently low that it will not later heat and deteriorate. The Seed Testing Station carries out pre-harvest moisture tests of wheat samples from growers in North Island districts as a guide to whether the moisture content is low enough for harvesting to begin.

Recent Research Work

WEED CONTROL

A view of the Waikato broad leaf dock trial after the second spraying showing good control of the docks.

WEED control is of national concern and the discovery of a number of weedkilling chemicals has given new importance to chemical methods of weed control. This is a subject of increasing complexity which has been studied in an extensive series of field trials each year, and the following notes of recent work on the control of docks will be of interest to many farmers.

DOCKS

WITH increasing fertility of much pastoral land, especially dairy pastures, weeds are often a major problem and must be controlled by chemical weedkillers. Important among these high-fertility weeds are the dock species—curled leaf dock (*Rumex crispus*), broad leaf dock (*R. obtusifolius*), and fiddle leaf dock (*R. pulcher*). Much experimental work has been carried out in the past with hormone weedkillers, but docks showed a high degree of resistance to all standard preparations of M.C.P., 2, 4-D, and 2, 4, 5-T. The most effective hormone preparation proved to be the amine salt of 2, 4-D, but satisfactory control was limited to certain stages of growth. With the advent of an ester based on water—the polyethylene glycol ester of 2, 4-D (P.E.G. 2, 4-D)—further trials were initiated to determine the efficiency of this preparation as compared with standard formulations.

WAIKATO TRIALS

Pilot trials comparing the efficiency of P.E.G. 2, 4-D and the standard preparations of 2, 4-D indicated the greater toxicity of P.E.G. 2, 4-D in dock control. Trials using P.E.G. 2, 4-D were laid down in the Waikato to determine the optimum stage of growth of broad leaf dock and fiddle leaf dock. The first treatment of docks was laid down in September. This treatment gave a good foliage kill, but regrowths occurred. Applications made in late October and early December gave a superior kill, and the few remaining regrowths were successfully eradicated by an autumn application of P.E.G. 2, 4-D. The optimum rate of application employed was 2lb. of acid equivalent per acre.

USE OF P.E.G. 2, 4-D

To date the most effective preparation for the control of dock species has been P.E.G. 2, 4-D applied at 2lb. of acid equivalent per acre. Trials have shown that the most effective control is obtained if the spray application is made when the docks have reached their maximum leaf development and are initiating flower head formation. After this stage docks tend to become woody and poor control results. An important consideration in controlling resistant plants such as docks in pastures is clover damage. Clover damage can be reduced greatly by prior hard grazing in a spell of 2 or 3 days of fine weather. This has the effect of reducing the clover leaf area and of removing protective vegetation from the dock leaves.

—*R. B. GORDON*

* * * *

NASSELLA TUSSOCK

EXPERIMENTAL work has shown that nassella tussock can be killed on two soil types with T.C.A. In one trial on sandy loam T.C.A. gave good results when applied to the flowering plants. Better results would be expected if the nassella had been burnt off before treatment. In another trial on a heavier soil T.C.A. was applied to a grazed and an ungrazed area of nassella tussock. Good control was obtained with one application, whereas two applications were required on the lighter soil. Seedlings that germinated after the death of the parent plants were effectively controlled with a light rate of T.C.A. Although trials have shown that nassella tussock can be destroyed with T.C.A., it has not yet been established what species may effectively be sown to replace the nassella tussock. Trials are being initiated with oversowing of T.C.A. and I.P.C. tolerant species such as clovers. Other chemicals such as the soil sterilisers C.M.U. and boron compounds will be tested on areas of nassella tussock on roadsides and fencelines. Biological methods of control have been investigated. Cocksfoot in spelled areas has suppressed nassella tussock, but its slow rate of establishment necessitates a prolonged period of non-grazing. Other species such as *Phalaris tuberosa*, lucerne, and blue tussock have not proved as successful as cocksfoot. In most instances surface-sown species establish better after burning of the nassella tussock.

SOIL STERILISATION

With the advent of several new chemicals interest has been revived in the field of soil sterilisation. The old types of soil sterilisers such as arsenicals and chlorates are hazardous to use, arsenicals being poisonous and sodium chlorate having explosive properties. Two new preparations based on borates and chlorates are perfectly safe and easy to use. Trials have been started to determine the effectiveness of these preparations on a unit basis in comparison with arsenicals, borates, and chlorates. The trials are of two types. In the first series the preparations are applied at low rates sufficient to kill or check all growth temporarily. In the second series the chemicals are applied at heavy rates of 1000lb. per acre and above. Sterility (the complete suppression of plant growth) follows for up to 1 year depending on soil type, rainfall, and temperature. The above rates of application are to be compared in different areas with different plant species and soil structures. If these preparations prove efficient, they will be valuable for the treatment of paths, municipal areas, and wherever complete suppression of plant growth is desired. Trial work is being commenced with organic sterilisers such as C.M.U. and Endothal. C.M.U. is particularly interesting, because overseas it has effectively controlled vegetation for one or more years depending on soil type and rainfall. Its value under New Zealand conditions is worth investigation. Endothal is more lethal to grasses than broad-leaved plants. As a temporary soil steriliser for grasses T.C.A. has been shown to be of value. Experimental work on many soil types has shown that T.C.A. is leached from soils low in colloidal content more quickly than from soils high in organic content. In volcanic soils it is leached by 1 to 2in. of rain, and higher rates of application are required for effective weed control on these soils.

—*L. J. MATTHEWS*

Early-spring Management of the Apiary

Seasonal Notes for the Domestic Beekeeper

THE increasing warmth of spring and the early flow of pollen and nectar from sources such as fruit tree blossom and willow encourage colonies of bees to begin brood rearing, which should continue at a constantly accelerated pace, enabling the colonies to reach maximum strength by the time the main nectar flow starts. Correct management of the domestic apiary at this stage is therefore of great importance and is discussed in this article by T. P. J. Williams, Apiary Instructor, Department of Agriculture, Hamilton.

THIS time of the year is usually the beginning of a busy period for bees and beekeeper. Management during the next few months will determine to a large extent the crop that a colony will have produced by the end of the honey flow. Every advantage should be taken of fine, warm days to give each colony a thorough overhaul. It will be necessary to ensure that each hive has sufficient stores of honey and pollen and that the queen is in good condition and to examine the brood for indications of disease.

Handling of Bees

Bees may be handled quite easily under some conditions, as for example with a new swarm or when the weather is warm and they are bringing in nectar and pollen. However, no matter what the conditions a beekeeper should always wear a bee veil to protect his face and give him a sense of security. Details of a handy type of folding wire bee veil are contained in Bulletin No. 267 "Beekeeping in New Zealand", pages 10 and 11, which is available from main offices of the Department at 2s. 6d. per copy.

No beekeeper can afford to be without a bee smoker, without which it would be almost impossible to work a hive. Smoke frightens bees, which consider themselves in danger of losing their home and take the precaution of filling themselves with sufficient honey to last them a few days. When in this condition they are not so inclined to be aggressive, hence the use of smoke. Old, clean sacking or pine needles make good smoker fuel.

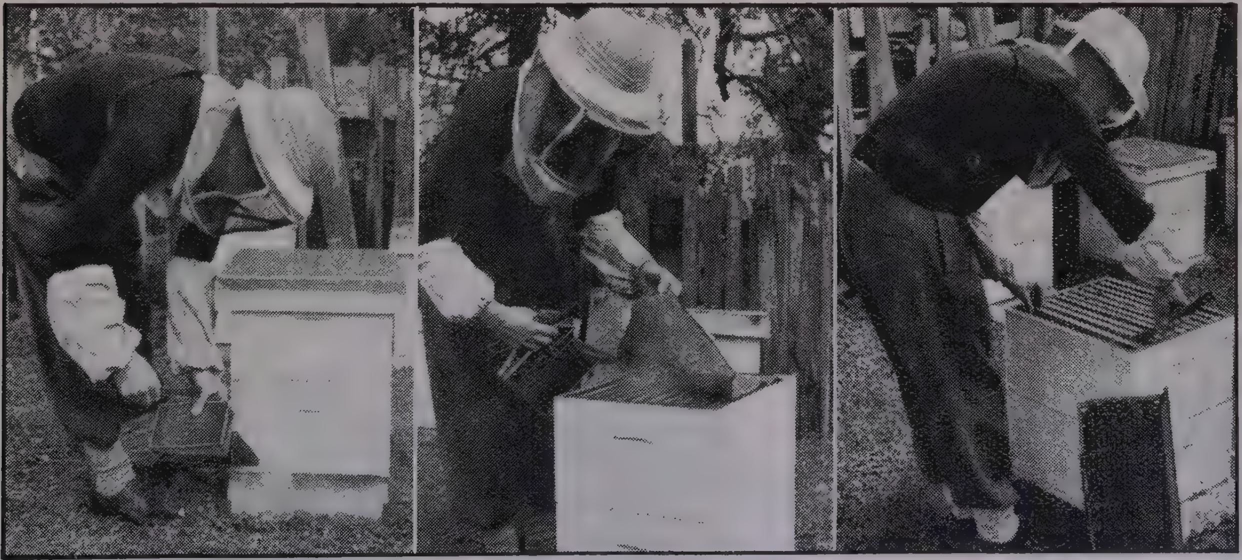
When a hive is being worked the beekeeper should not stand in front of the hive entrance, but to one side. Before the hive is opened a few puffs of smoke should be given at the entrance. The cover is then removed and placed alongside the hive in a reversed position so that, if necessary, the top box may be placed on it while the lower box is being examined. The smoker is again brought into use when the mat is being removed. A few gentle puffs drive any bees off the tops of the frames. The smoker may then be placed to one side until the bees show signs of becoming aggressive. Individual frames can then be lifted out, care being taken to avoid quick, jerky movements and jarring of the hive or frames. When all the combs in the brood chamber are to be examined, the first outside nearest frame should be removed and stood against the hive close to the entrance. This will allow plenty of room for the beekeeper to examine the other combs and so avoid crushing bees.

Cleaning the Hive

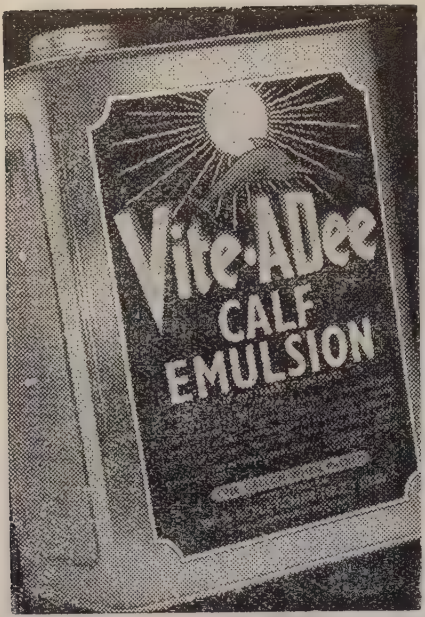
A quantity of refuse will be found on the bottom board of the hive after winter. The best way of removing this is to have a spare, clean bottom board. The hive should be lifted off its stand on to the clean board and the old one removed and cleaned.

The entrance to the hive should be kept clear of grass, which would obstruct the bees in their flights to and from the hive, causing the deaths of many. A piece of old tin laid down in front of the hive will stop the grass from growing and so keep the entrance clear.

Examining the brood for disease and to gauge the condition of the queen.



Examining the hive. Left—The hive entrance should first be smoked. Middle—The cover is then removed, the mat folded back slowly, and the bees on top of the frames are smoked. Right—The outside frame is removed and stood alongside the hive entrance. This allows plenty of room for manipulation of the remaining frames.



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Stores and Feeding

Even though the bees are active at this time of the year gathering nectar and pollen, they are not safe in regard to stores, for it is at this time that there is the greatest danger of starvation. The hive is stimulated by the early flow, brood rearing is rapidly increased, and heavy inroads are made into stores. The colony will therefore require 30lb. of honey or six full combs.

If the beekeeper does not have any frames of honey on hand for feeding, a solution of sugar syrup is a convenient substitute. On no account should honey be fed to bees unless there is certainty that it has come from disease-free hives.

A sugar syrup is prepared by mixing one part of sugar to one of water by volume. The sugar will dissolve readily in hot water and the syrup should be fed to the bees when it is lukewarm. A simple type of feeder to use is a 5lb. honey tin with a few small nail holes punched through the lid. The tin is reversed over a hole cut in the hive mat. An empty super is placed on the hive to provide space for the tin. The syrup should be fed to the bees as late in the day as possible.

Equipment for handling bees consists of a cork topee hat, a wire bee veil, gloves, cuffs, a smoker, and a hive tool.

Condition of the Queen

From now on the queen is called on to lay sufficient eggs not only to maintain the colony strength but to increase it so that by the time the main honey flow is about to begin the hive will have reached maximum strength. If the queen fails at this stage, as old queens often do, any surplus honey which may have been gathered will now be lost.

If there is no brood or eggs at this time, it may be assumed that the hive is queenless. No worker brood but plenty of drone brood would indicate that the hive has a drone layer or laying workers. A queen should be procured without delay or the hive put on top of a colony that has a queen. The two hives should be separated by a sheet of newspaper. When this has been gnawed through the bees will unite peacefully.

The condition of the queen may be gauged by examining the frames of brood. A good queen will have her brood laid in a compact group, whereas a poor queen lays patchy brood.

Disease

A careful watch should be kept on the brood. If the cappings over the brood cells are all even in colour, well rounded, and compact, the brood may be considered clean. Should American foul-brood (*Bacillus larvae*) be present, some of the cappings will be darker in colour than those of the surrounding brood and some sunken or punctured. When a doubtful cell is found the capping should be removed. If the cell is healthy, the white larva or the head of the bee will be seen, but if there is a dark mass lying in the cell, a match stick or twig should be inserted into it, twisted, and withdrawn. If the mass adheres to the stick and may be roped out for a short way, foul-brood is indicated.

Bulletins for the Beekeeper

Free Bulletin
No.
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Chargeable Bulletin
No.
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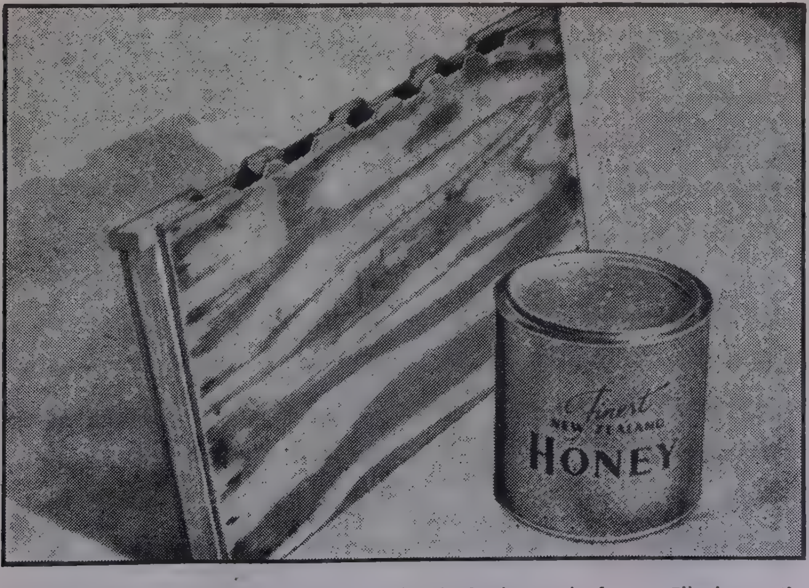
The above bulletins, part of a series of over 350 on all aspects of farming, are available post free from the nearest office of the Department of Agriculture, or from the Head Office of the Department, Box 2298, Wellington.

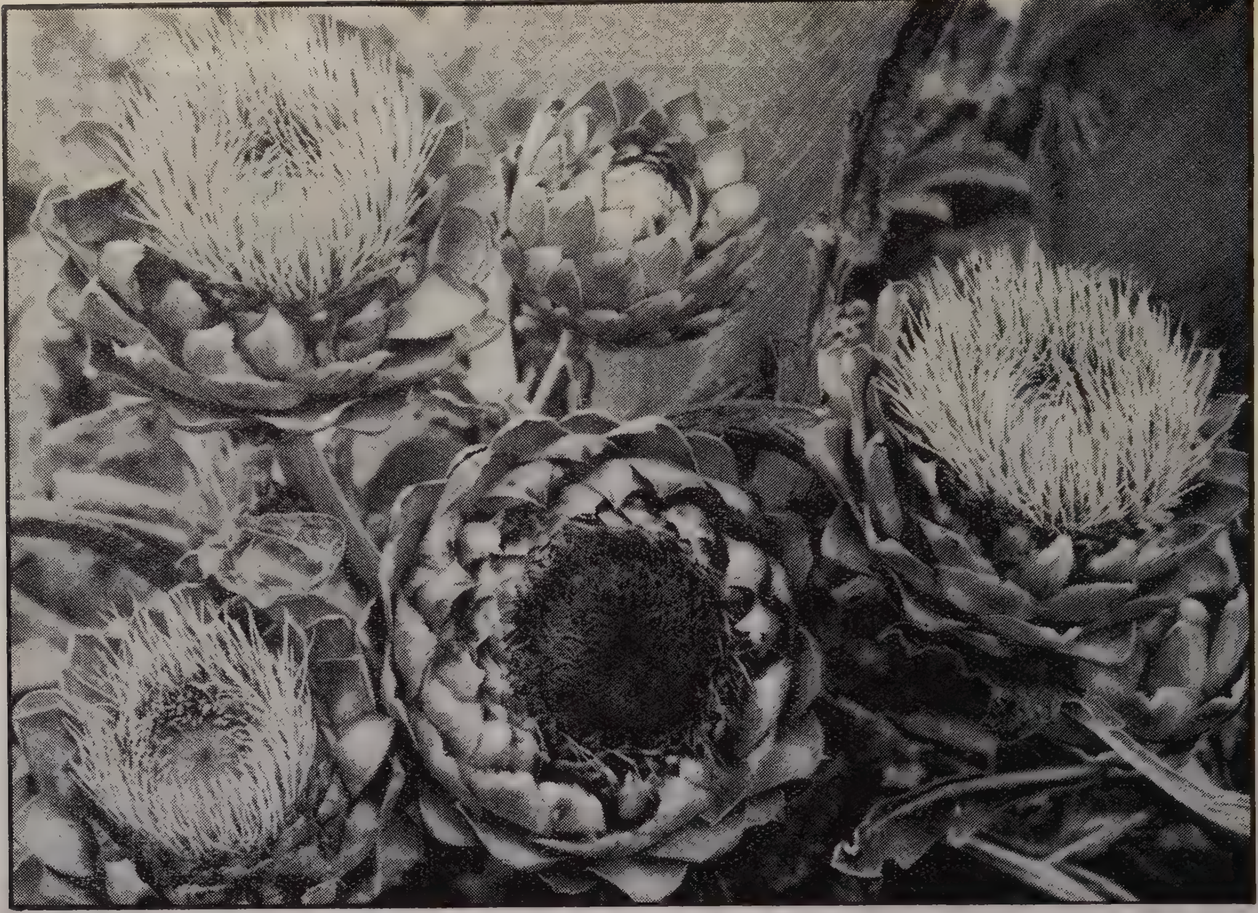
When this disease is discovered the hive should be closed. The hive tool should be scorched in a fire and any other equipment washed in disinfectant. Too much care cannot be taken to avoid carrying the infection to other hives.

Advice on the best way to destroy the hive should be obtained from the Apiary Instructor for the district.

All photographs by Morgan's.



Left—A division-board feeder. Right—A handy feeder made from a 5lb. honey tin.



HEADING PHOTOGRAPH: Globe artichoke. The flower bud in the centre back is ready for harvesting. All other buds have flowered and therefore are too old.

Less Well-known Vegetables that Deserve a Trial in the Home Garden

VEGETABLES form an important part of man's diet and provide a major proportion of the vitamins necessary to maintain health. The fresher the vegetables are the more nutritious they are and also the more palatable. A good selection of vegetables not only adds variety to the menu, but assists in providing a more balanced diet. Many gardeners grow only a small selection of vegetables year by year and these tend to become very monotonous if served continually. Gardeners could therefore consider increasing their range of vegetables even if only to add variety. Some of the less well-known vegetables which could be grown in many parts of New Zealand are discussed in the first part of this article, which is by C. L. Napier, Horticultural Instructor, Department of Agriculture, Hastings. The section on routine work in the home garden is by S. O. Gillard, Horticultural Instructor, Department of Agriculture, Auckland.

BECAUSE a vegetable is not grown extensively does not mean that it is difficult to grow. Generally it means that gardeners are not conversant with the conditions required or how the vegetables are used. By varying the methods of culture described to suit their particular district, gardeners should have no difficulty in raising most of the vegetables mentioned. Sowing dates have been given for a particular district, but gardeners will be able to adjust these to suit their own requirements.

Borecole or Kale

Borecole or kale (*Brassica oleracea acephala*) is a member of the cabbage family, but unlike its relatives it produces neither heart nor flower. Kale has been in cultivation for many centuries, several varieties being known by the ancient Greeks as far back as 200 B.C. This vegetable is a good source of calcium and iron and vitamins A and C and to a less extent vitamins of the B group.

Soils and Fertilisers

Any good garden soil that will grow other members of the cabbage family is suitable for kale. It is a heavy feeder and will do better in poorer or lighter types of soils if organic matter is added to them.

A fertiliser mixture made up in the ratio of 5lb. of sulphate of ammonia, 10lb. of superphosphate, and 2lb. of sulphate of potash applied at 3 to 4oz. per square yard will also give good results. As all brassicas require comparatively generous quantities of lime, this should be added if considered desirable.

Sowing and Cultivation

As kale is a winter and spring vegetable, seed should be sown in time for the plants to mature before winter. For example, in Hawkes Bay sowing is done during October and November and plants are set out in early January. Seed can be sown in beds or short rows and plants set out 18 to 24in. apart in rows 30in. apart. Alternatively seed can be sown in the permanent site and plants later thinned to the desired distance.

Cultivation is the same as for cabbage and care should be taken to keep the plants free from pests and diseases that normally attack cabbages and cauliflowers. Watering may be necessary in the early stages to assist establishment, and side dressings of nitrogenous fertilisers or liquid manure may be needed to encourage quick development of leaf, particularly during unfavourable conditions. Tall kale may need moulding up if it falls over in windy weather.

Varieties and Uses

There are a number of varieties or types of kale and most can be divided into two main groups, Scotch and Siberian. Scotch kale is greyish green and very curled and crumpled; Siberian is bluish green and not curled as much as the Scotch type. Fine curled strains are the ones normally grown by home gardeners.

Kale can be used fresh in salads when young or boiled like cabbage. In the home garden the outer leaves can be plucked off as required or whole plants removed as with cabbages.

Celeriac

Celeriac (*Apium graveolens rapaceum*) is related to celery and it is probable that both originated from the same parent. Celeriac has a flavour similar to that of celery, but has a turnip-shaped root, which is the part normally eaten.

Soils and Fertilisers

Celeriac is hardier and more easily grown than celery and for this reason could be more widely grown by home gardeners. It will succeed in a wide range of soils, but like celery it does best in rich, moist but well-drained soils. To facilitate watering the plants can be grown in trenches, but care must be taken not to bury the bulbous roots.

A balanced fertiliser of the same ratio as that recommended for kale is suitable for celeriac, but care should be taken to see that the soil is rich in organic matter if steady growth is to be maintained.

Sowing and Cultivation

In Hawkes Bay early sowings are made under glass in June and July. Sowings can be made outdoors in late September or early October after the soil has warmed up. Seed should not be sown more than ¼in. deep and is best sown in boxes for early crops. Later sowings can be made in beds or in drills in the area in which they are to mature. Plants can then be planted, or thinned out to, 6 to 8in. apart. Rows should be sufficiently wide to allow for cultivation. Care should be taken not to damage the roots during hoeing or other cultivation.

Cultivation is simpler than that for celery, as no blanching is required. Water should be given if conditions are dry, and the developing bulbous root should be kept free of soil. The removal of suckers as soon as they develop will give more attractive roots.

Uses

The bulbous root can be sliced or diced and used raw in salads or boiled and thickened with white sauce. The roots and tops can also be used like celery in soups or stews. Late crops, particularly where soil conditions become wet and heavy in winter, can be lifted and stored in pits or sand in a similar manner to carrots. Before being stored the bulbs should be trimmed of roots and the leaves should be shortened to a few inches.

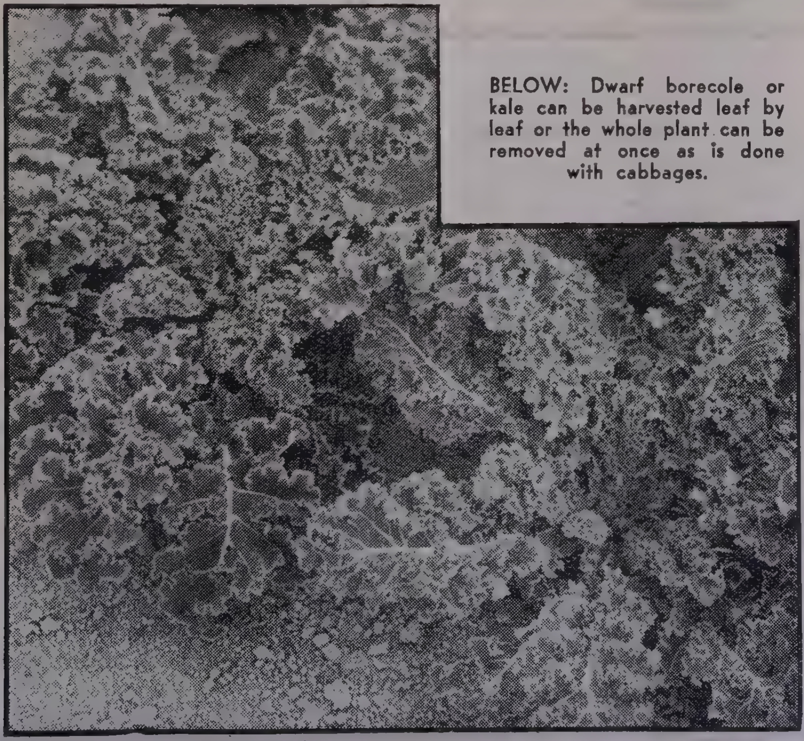
Salsify

Salsify (*Tragapogon porrifolius*) is also known as vegetable oyster, because the flavour suggests that of oysters. The vegetable is of comparatively recent introduction as a garden variety and is a native of southern Europe or west Africa.

Soils and Fertilisers

The culture of salsify is somewhat similar to that of parsnips. A deeply dug, rich, and moist soil is best, any plot heavily manured for a previous crop being excellent. If the soil is rich in organic matter, no other fertiliser should be required.

The roots and leaves should be removed from the bulb of celeriac before it is prepared for the table. Leaves can be used for flavouring.



BELOW: Dwarf borecole or kale can be harvested leaf by leaf or the whole plant can be removed at once as is done with cabbages.

Sowing and Cultivation

Sowing can begin in August in Hawkes Bay and may continue until December or January. The seed can be sown ½in. deep in drills 15 to 18in. apart and seedlings thinned later to 3 to 4in. intervals.

Cultivation consists of keeping weeds down and providing water when the plants are young.

Varieties and Uses

Sandwich Island is the variety usually grown in New Zealand. Plants grow to about 2in. in diameter at the crown and up to 10in. long, being somewhat similar in shape to parsnips. Roots can be harvested at any time after they are half grown.

Roots are normally boiled and prepared with a sauce in the same way as celeriac. Cold salsify can be fried in fritters.

Plants will stand well over the winter, but can be lifted and pitted or stored in sand. About 2in. of the tops should be left attached to the roots to prevent shrivelling in storage.

Kohl Rabi

Kohl rabi (*Brassica oleracea caulorapa*) is grown for the turnip-like, swollen stem which normally is the only part eaten. The vegetable is a native of the Mediterranean region

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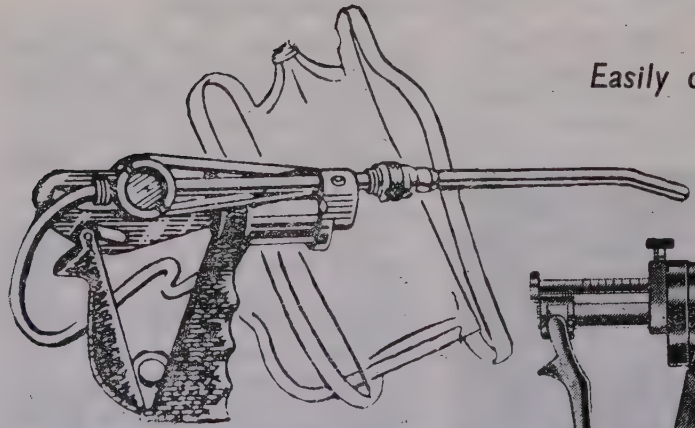

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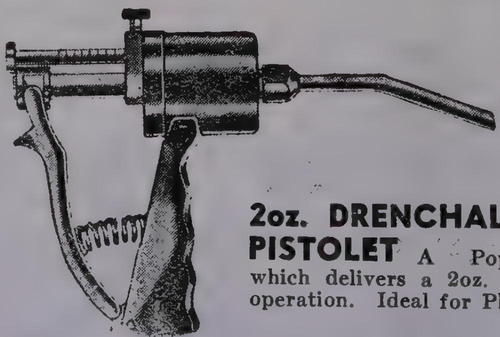

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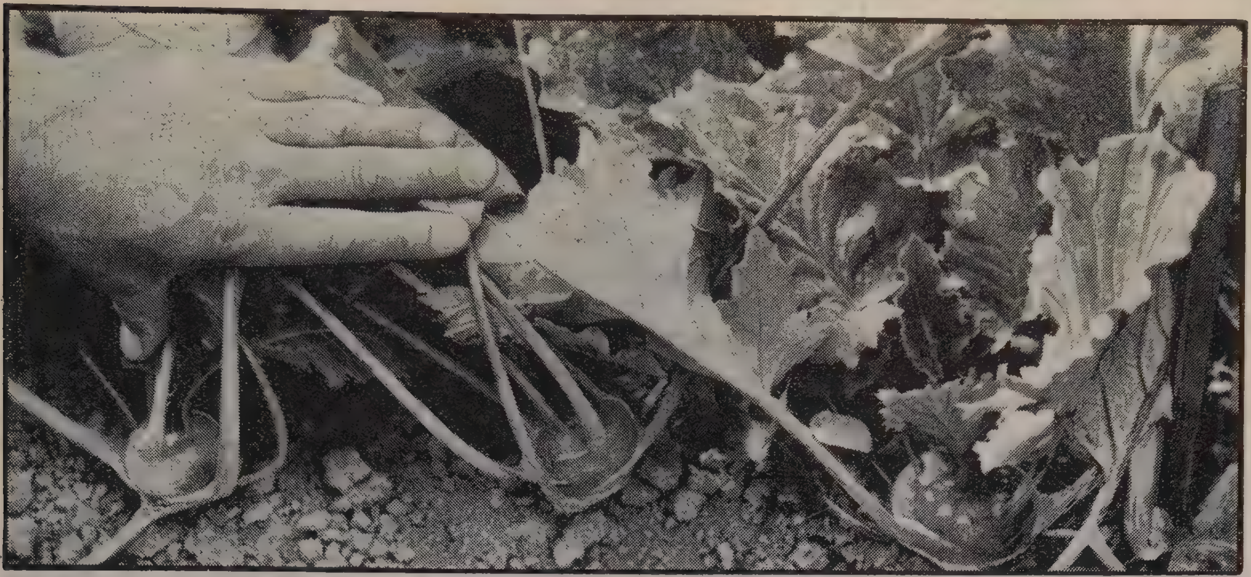

Kohl rabi. The root on the right could be harvested at this stage. Plants are the desirable distance apart.

and has been in cultivation since very early times. Like all brassicas it is a good source of vitamin C and also provides a small quantity of vitamin B_1.

Soils and Fertilisers

Kohl rabi grows well in soils similar to those preferred by other brassicas; that is, soils rich in humus with adequate moisture but good drainage. It should do well in rich soils without the addition of any fertilisers, but if extra plant food is necessary, the fertiliser mixture recommended for borecole should be satisfactory.

Sowing and Cultivation

Although seedlings transplant quite well, it is usual to sow the seed where the plants are to mature. In Hawkes Bay sowings can be made from September onward. Seed should be sown not more than ½in. deep in rows 12 to 18in. apart. Plants should be thinned to 6 to 8in. intervals. Late February or early March sowings should give autumn and early-winter crops.

Kohl rabi does best in the coolness of spring and early summer and also in autumn. It will, however, do well during summer provided it can be kept growing. Rapid growth will give tender, mild "roots", whereas slow growth gives a bitter flavour and coarse flesh.

Varieties and Uses

White Vienna and Purple Vienna are the two most popular varieties in New Zealand. In from 2 to 3 months from sowing the "roots" should be ready for harvesting. They should be used when no more than 4in. in diameter; otherwise they may be tough and woody. The bulbs or "roots" are prepared in the same way as turnips.

Although kohl rabi is stored for winter use in some countries, it does not appear to keep as well as some other root crops.

Globe Artichoke

The globe artichoke (*Cynara scolymus*) is a herbaceous perennial not unlike a large thistle. It is a native of the Mediterranean region and has been cultivated for several centuries. The edible flower bud contains vitamin B_1 and a smaller quantity of vitamins A and C.

Salsify. Its roots provide a delicious variation to meals and are easily grown.

Soils and Fertilisers

Globe artichokes will thrive on almost any soil type provided moisture is sufficient. However, they prefer a rich, deeply dug soil, and a good water supply is needed to produce succulent flower buds.

If fertilisers are necessary, one rich in nitrogen is beneficial. Nitrogen applied shortly before cutting tends to give good-quality buds.

Sowing and Cultivation

In Hawkes Bay sowing is usually done during September and October and the plants are later set out (or thinned if seed has been sown in drills in the areas where plants are to mature). If sowing under glass is done in July or August, plants should be ready for setting out in about 6 weeks and will produce a few buds the first year. Later sowing means waiting until the second season, but the crop will then be larger.

Raising from seed does not always give highly productive plants. It is therefore best to propagate from plants that produce a plentiful supply of good-quality buds. Plants usually produce suckers and only a few of the best should be left when they begin spring growth. These can be removed with as much root as possible when about 12in. high. Suckers must be planted firmly and deeply and not allowed to dry out. As globe artichokes are rarely successful after their third or fourth year, suckers are perhaps the easiest method of renewing stock.

Established plants should receive plenty of moisture and the buds should be ready for cutting when they have reached the stage of the bud in the centre back of the illustration on page 260.

When growth has died down in autumn the stalks should be cut to within 1ft. of their bases and the bed

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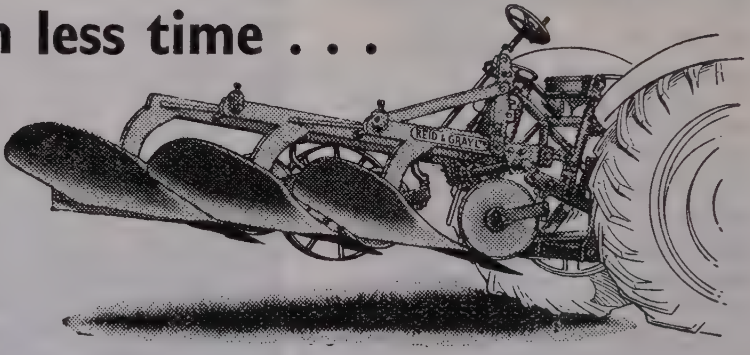

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Left—Mature and unblanched foliage of sea kale. The centre seed stalk should not be allowed to grow when plants are being blanched. Right—Egg plant fruits can be thinned out when young. This will give fewer but larger fruits.

then dressed with manure in a similar manner to asparagus beds. If winters are severe, beds can be earthed up or covered with some material to guard the crowns against injury.

Varieties and Uses

Propagation by suckers from reliable plants is the best method of maintaining quality.

Buds can be prepared in several ways. To obtain large terminal buds it is normal to remove the smaller side buds when they are about egg size. These can be fried, boiled, or eaten raw. The terminal buds are usually boiled. The American method is to trim the buds and soak them in water for ½ hour. They are then drained and cooked in salted boiling water until tender (about ½ hour) and eaten with butter and salt. Of the larger outer scales the main edible portion is the fleshy base. The inner scales are edible throughout, but the spiny centre (choke) of the bud is discarded.

The taste for globe artichokes is an acquired one and many people class them as a luxury. The main disadvantage of this plant is the relatively large amount of space it requires, but it can be planted in odd back corners of the garden.

Sea Kale

Sea kale (*Crambe maritima*) is a hardy perennial and a native of western Europe. It is grown by few gardeners, but it has a delicate flavour which should make it more popular. It is grown for its young leaves and shoots, which are normally blanched.

Soils and Fertilisers

Although sea kale will grow in any normally rich soil, a bed prepared as for rhubarb is best. This bed should be replenished each year with organic matter or other fertilisers to keep up the fertility of the soil. A well-kept bed should remain productive for a number of years.

Sowing and Cultivation

Sea kale can be grown from seed sown under glass in June or July or outside in September and October. Early sowing should give plants for setting out in October. Seedlings need to be thinned early to give sturdy plants. Late sowing often means transplanting the following spring.

Sea kale requires plenty of space, because it has to be covered for blanching. Seedlings or plants can be set at 18 to 24in. intervals with the crowns about 2in. below the surface.

Root cuttings about 4 to 6in. long can be taken and planted in their permanent positions in early spring.

At the end of the growing season the dead leaves should be removed and the bed can then be mulched with compost. About June the crowns should be covered with inverted boxes or flower pots that exclude all light. These can then be covered with sacking or other suitable material to keep the winter temperature comparatively high inside.

Light harvesting can begin the second season and normal harvesting lasts about 3 to 6 weeks. Growth should be watched closely and when shoots are about 5 or 6in. tall they should be cut in the same way as asparagus. When the cutting season is finished the coverings are removed and a thin layer of soil spread over the crowns. During the growing season sea kale will benefit from plenty of moisture and liquid manure.

Varieties and Uses

No specific varieties are available. The blanched shoots can be boiled and served with white sauce in the same way as celeriac.

Egg Plant

The egg plant (*Solanum melongena*) obtains its name from the flavour of the cooked fruit, which suggests fried eggs. Its origin is rather obscure, but it has been in cultivation for many centuries. Egg plants do well in mild climates and they could be grown to a greater extent.

Soils and Fertilisers

Soils and plant foods suitable for tomatoes are ideal for egg plants, which are gross feeders. Warm, rich, and well-drained soils are best, but moisture must be plentiful. Soil enriched with compost or other organic matter is desirable. A mixed fertiliser made up of, say, 3lb. of sulphate of ammonia, 10lb. of superphosphate, and 1lb. of sulphate of potash at 3oz. to the square yard will encourage good production.

Sowing and Cultivation

As the egg plant requires a long, warm season, it should be sown early and set out as soon as frosts are past. In Hawkes Bay seed can be sown under glass in July or early August and the plants set out in October. If transplanted carefully when about only 4in. high, they should establish quickly. Plants should be set about 24in. apart in rows 30 to 36in. apart

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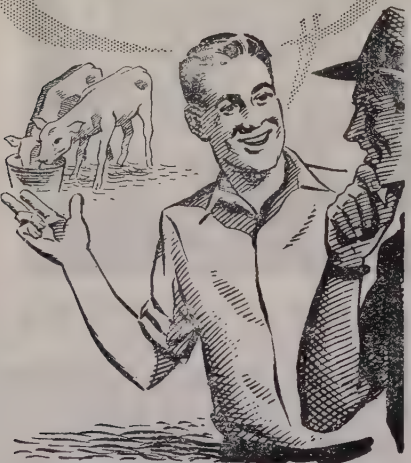

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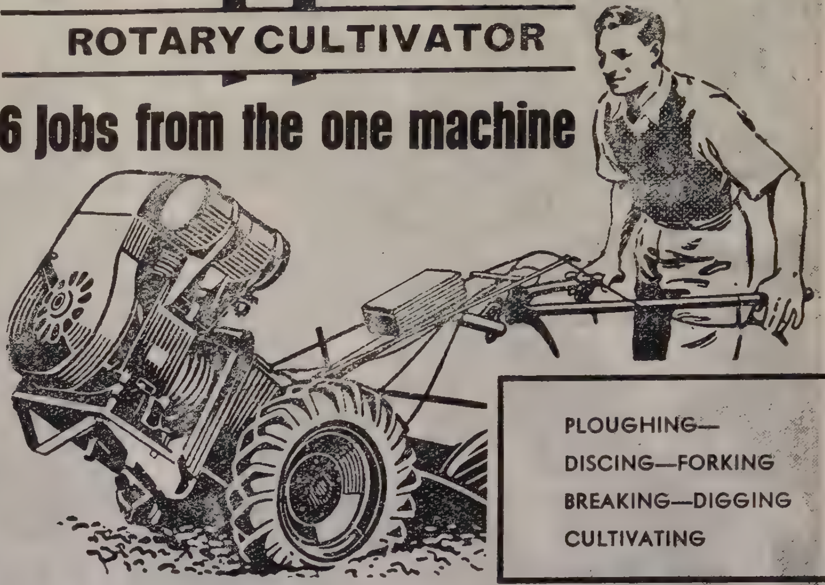

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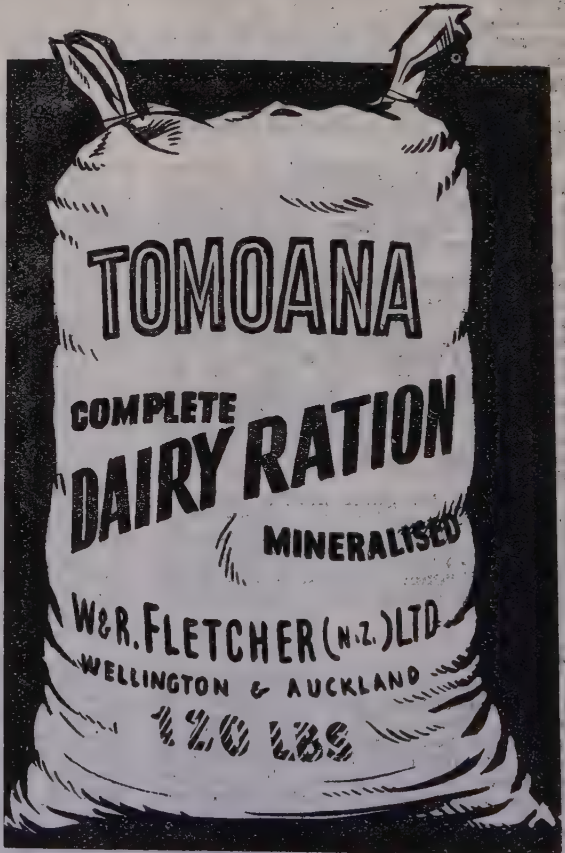


to give plenty of room for development. Mature plants are about 3 to 4ft. high. Pricking out in pots and careful setting out later will reduce all possible checks.

Egg plants should be kept growing steadily throughout their season with water and fertilisers as necessary. The growing season varies, but in ideal conditions it is about 5 months. Cultivation during the season is similar to that of tomatoes. When plants are about 8in. high growing points can be nipped out to encourage branching. If winds are a problem, staking would be an advantage.

Varieties and Uses

There are three main varieties of egg plants: *Esculentum* with large, egg-shaped fruits, *serpentinum* with long and slender fruits, and *depressum*, a dwarf type with small pear-shaped fruits. The first is the main variety grown in New Zealand and produces large, deep purple fruits. Varieties are Black Beauty and New York Improved.

Fruits should be harvested when they are fully coloured but before there is any suspicion of shrivelling. If left until this stage, they are very seedy.

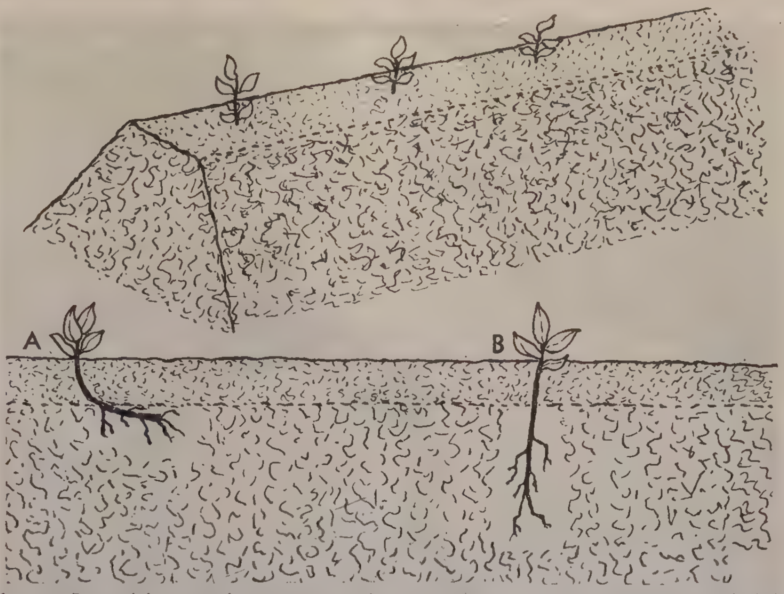
Egg fruit can be baked, boiled, or roasted like pumpkin and served with meat. It can also be stuffed or fried, the latter method being the most popular. For frying the fruits are cut in ½in. slices like bananas. They can be soaked in salt water overnight or salted and fried in batter immediately.

Other Vegetables

Other vegetables that have particular uses in the home garden are red cabbage, endive, and peppers.

Red Cabbage

Red cabbage is grown mainly for pickles, to which it gives an attractive appearance. It can, however, be used in salads or cooked like the green types. As most red types are slow maturing, they should be sown in early spring.



Upper—Rooted kumara shoots set out about 18in. apart on broad low ridges slightly flattened to assist retention of moisture. Lower—A: Correct method of planting; the root is bent to retard the flow of sap from roots to leaves, which induces better tuber development and heavier cropping than with perpendicular planting (B).

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Endive

Cultivation of endive is similar to that for lettuce, except that plants can be blanched before harvesting. Endive can be boiled as a green or used as a salad.

Peppers

Peppers are also known as capsicums and certain varieties as chillies. They grow well in warm districts such as Hawkes Bay and can be used in pickles, chutneys or soups, can be stuffed and baked, and sliced in salads. Peppers and endive will be discussed in an article on salad vegetables in the October issue of the "Journal".

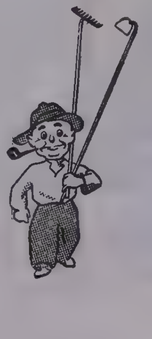
References

"Vegetable Crops", by H. C. Thompson.
New Zealand Department of Agriculture Bulletin No. 342, "The Home Vegetable Garden".

Acknowledgment

Acknowledgment is made to Mr. J. Beamish, Hastings, for information and provision of many subjects for photography.

Work for October



DURING October work in the home garden is varied and in many districts that month is one of the busiest of the year. However, discretion is still necessary in sowing or planting frost-tender vegetables. In southern parts of the North Island and in the South Island there is still a likelihood of damaging frosts and some protection such as cloches, hot-caps, or wooden boxes with glass coverings will be necessary for tender plants.

Preparation of the ground for successional sowings and plantings should be continued and the soil made ready for the planting of pumpkins, marrows, etc. Early-planted potatoes should be moulded up as they grow to prevent wind or frost damage. In northern districts regular spraying with a copper compound will be necessary to prevent late blight infection. Growing crops should be hoed frequently, and crops such as cabbage and cauliflower should have the soil drawn up to them to give them support.

Frequent light cultivation is of great benefit to vegetable plants. It eliminates weeds, helps to aerate the soil, and assists in the regulation of soil moisture.

Earlier-sown crops of turnips, beetroot, parsnips, and silver beet will require thinning and hoeing. Where plants are not to be transplanted but are to remain in the bed until required for use, it is usually necessary to thin them; this work should be done as soon as the plants are large enough to pull and before they begin to "draw" or become spindly from crowding. The aim of thinning should be to leave the best plants as far as this can be done to give proper spacing. If plants are not allowed sufficient space, they will produce inferior crops.

To avoid unnecessary consolidation of the soil by walking on it after planting and to save valuable time later supports for tomatoes and runner beans should be placed in position and the soil worked up in readiness for planting. Driving stakes after plants are established may cause serious root injury.

Earlier-sown peas will require moulding up and supporting to keep them from coming in contact with the soil. Small stakes placed along each

[Sparrow

If the terminal shoots of the dominant leaders of pumpkin plants are pinched off, the fruit is produced closer to the bases of the plants and the vines are kept more compact.

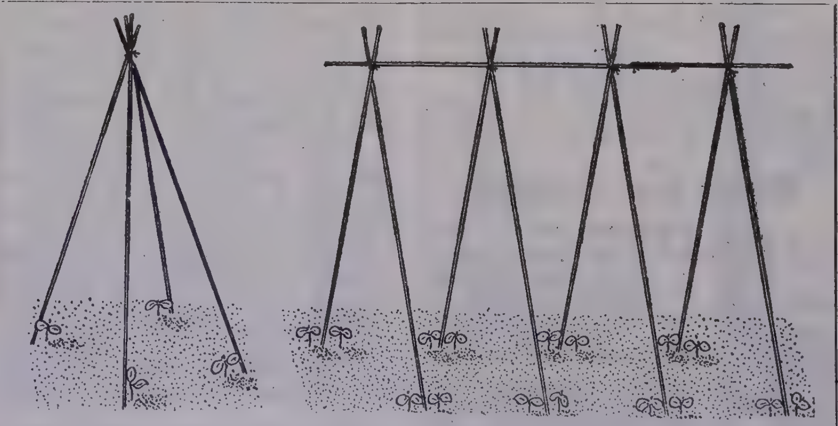
side of a row with three or four strings attached at different heights will support the plants.

Cauliflowers, cabbages, and lettuces nearing maturity will benefit from weekly applications of liquid animal manure. If the soil is wet and further moisture would be a disadvantage, a side dressing of nitrate of soda at the rate of ½oz. per plant is preferable. Care must be taken to see that the fertiliser does not touch the stems or foliage of plants; it should be worked lightly into the soil.

Sowings

Dwarf and climbing beans: All varieties of beans except broad beans are frost tender and require warm conditions for germination and growth. Climbing varieties yield more and produce over a longer period than dwarf and are not so subject to roots disease. They are especially suitable where garden space is limited. Beans can now be planted in all districts where late frosts are unlikely.

Good varieties are: Dwarf, The Prince and Canadian Wonder. Climbing, Fardenlosa and Scarlet Runner. Scarlet Runner is a perennial and is undoubtedly one of the hardiest of its kind. It differs from the annual climbing bean in that its roots thicken, and in well-drained soils where winter conditions are not too severe the thick fleshy roots will shoot again each spring, usually when frost danger is past.



Supporting climbing beans. Left—Four stakes 7ft. long set 2ft. apart each way to form a square and the tops drawn together wigwam fashion and tied. Right—Stakes placed at intervals to form a double row and tied to a pole along the top.

Lima beans: Two good types are Burpee's Bush and the tall variety King of the Garden.

Edible soy beans, like lima beans, are grown mainly for their seed and are used dry in a similar way to haricot beans. Good varieties are Manchu and Bansei.

Sweet corn: Seed can be sown now in the North Island north of Manawatu. Golden Cross Bantam is a good variety.

Pumpkin, squashes, and marrows may be sown toward the end of the month north of Manawatu. Good home garden varieties are:—

Pumpkin: Crown, Triamble, Queensland Blue.

Squash: Red Warren, Golden Hubbard.

Marrow: White Bush and Green Bush.

The following may be sown in all districts:—

Beetroot: Crimson Globe, Detroit Red.

Silver beet: Lucullus, Fordhook Giant.

Carrot: Early Krop, Manchester Table, Chantenay.

Turnips: White Stone.

Peas: Greenfeast (dwarf), Alderman (tall).

Radish: French Breakfast, White Icicle.

Spinach: Prickly seeded.

Parsnips: Hollow Crown.

The following may be sown in seedling beds for transplanting later:—

Leeks: Musselburgh.

Lettuce: Neapolitan and Great Lakes.

Celery (in Northland and Auckland): Golden Self-blanching.

Brussels sprouts (in southern districts): Fillbasket.

Plantings

Potatoes: Main-crop potatoes should be planted without delay. Good varieties are Arran Chief, Aucklander Short Top, King Edward, Inverness Favourite, and Dakota. The last variety is not suited for districts north of Manawatu.

Cabbage plants should be set out 18 to 24in. apart in rows 24 to 30in. apart. The soil should have been well prepared and enriched to promote rapid growth to mature the plants before the weather becomes too hot. Recommended varieties to plant now are Golden Acre, Henderson's Succession, Copenhagen Market, and Enfield Market.

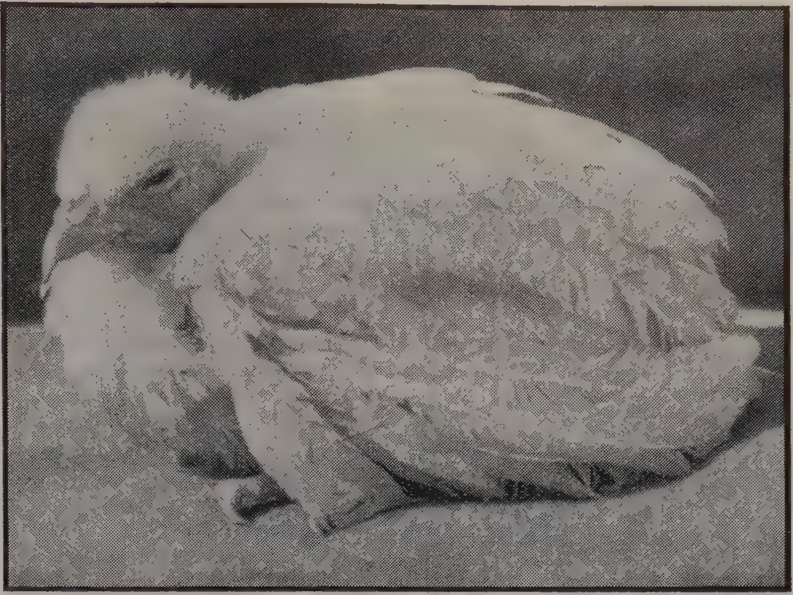
Tomatoes can be planted in many parts of the North Island. Good varieties include Adelaide Dwarf, Early Chatham, and Stoners Dwarf Gem (dwarfs) and Potentate, Carters Sunrise, Moneymaker, and Stoners Prolific (tall varieties).

Lettuce should be set out in a rich soil; the ground should not be allowed to become dry. Recommended varieties to plant now are Neapolitan and Great Lakes.

Kumara: In districts north of Manawatu plants can be set out on ridges. The best varieties are New Zealand Red and New Zealand Pink.

Symptoms and Control of X Chick Disease

THE condition X chick disease has become quite well known to poultry farmers in many areas of the South Island, and the name, originally given because of its unknown cause, has continued in popular use. After several seasons of field investigation and experimental work the disease is recognised as a form of vitamin E deficiency. This article by J. J. Thompson, Veterinary Research Officer (Poultry), Department of Agriculture, Wellington, describes briefly the research work carried out and the results which have been obtained together with recommendations on the prevention of chick losses from the disease.



A 4-week-old chick showing the typical symptoms of X chick disease. The chick is unable to stand upright.

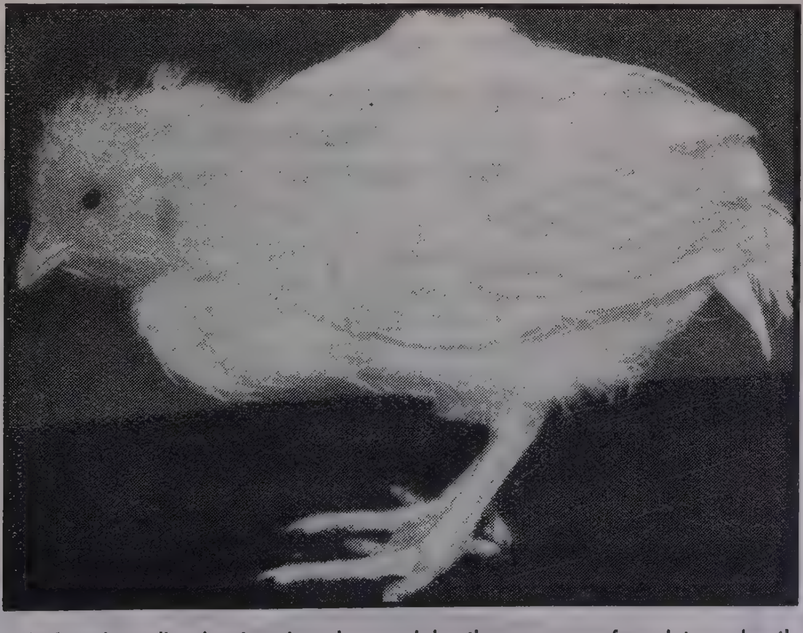
ALARMING losses of up to 80 per cent. in batches of young chicks on poultry farms in the Dunedin and Invercargill areas were reported during the 1950 rearing season. Early attempts at diagnosis soon showed that a new condition was being encountered.

From the number of birds affected and the apparent rapid spread of the disease it was obvious that the condition was:—

1. An infectious disease probably of bacterial origin; or
2. A condition caused by some factor common to all the chicks, such as a fault in management or a nutritional deficiency which would affect the whole batch of chicks.

The cause of the condition remained unsolved during that season, and further research work had to be postponed until the following year to await any fresh outbreaks which might occur. In the meantime a limited survey showed that the disease had occurred fairly extensively throughout the area.

In the following year the disease was encountered in the Canterbury, Otago, Southland, and West Coast areas. Ample material was therefore available for laboratory examination, and full advantage of it was taken to follow up the work done in the previous season. Full reports of the disease, the management conditions, the source and type of feed used, the symptoms and death-rate, and all the details which might furnish even a little extra information were sought from the affected farms. In this way a comprehensive knowledge of X chick disease was built up and recorded for study.



A chick with swollen head and neck caused by the presence of exudate under the skin. This chick died shortly after the photograph was taken.

The facts obtained showed that the disease was present on poultry farms which reared chicks by battery brooders, by infra-red lamps, by electric hovers of various types, and under conditions of management which ranged from very good to very poor. This information ruled out the possibility of the condition being caused by bad management.

In addition all attempts to transmit the disease from affected to healthy chicks failed, both in the field and in the laboratory, and extensive laboratory work to isolate bacteria which could be responsible was equally unsuccessful.

Full consideration of the facts obtained from field investigations and the symptoms and course of the disease combined with the failure to show that the disease was infectious pointed to the condition being a nutritional one.

In the symptoms and post-mortem lesions of the disease some resemblance was noted to an experimental condition which arose from the feeding of a particular artificial diet to chicks and which proved to be a form of vitamin E deficiency. This experimental condition, known as exudative diathesis, could be prevented by adding vitamin E to the diet either in the form of the pure vitamin or of a foodstuff containing it, such as wheat germ meal. This opened a new line of investigation, subsequently proved to be the right one.

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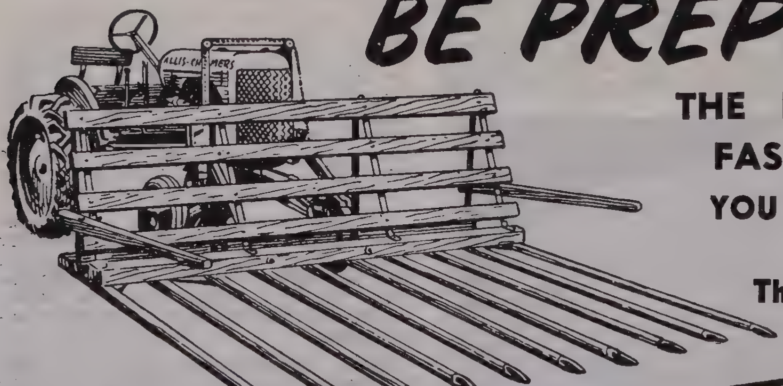

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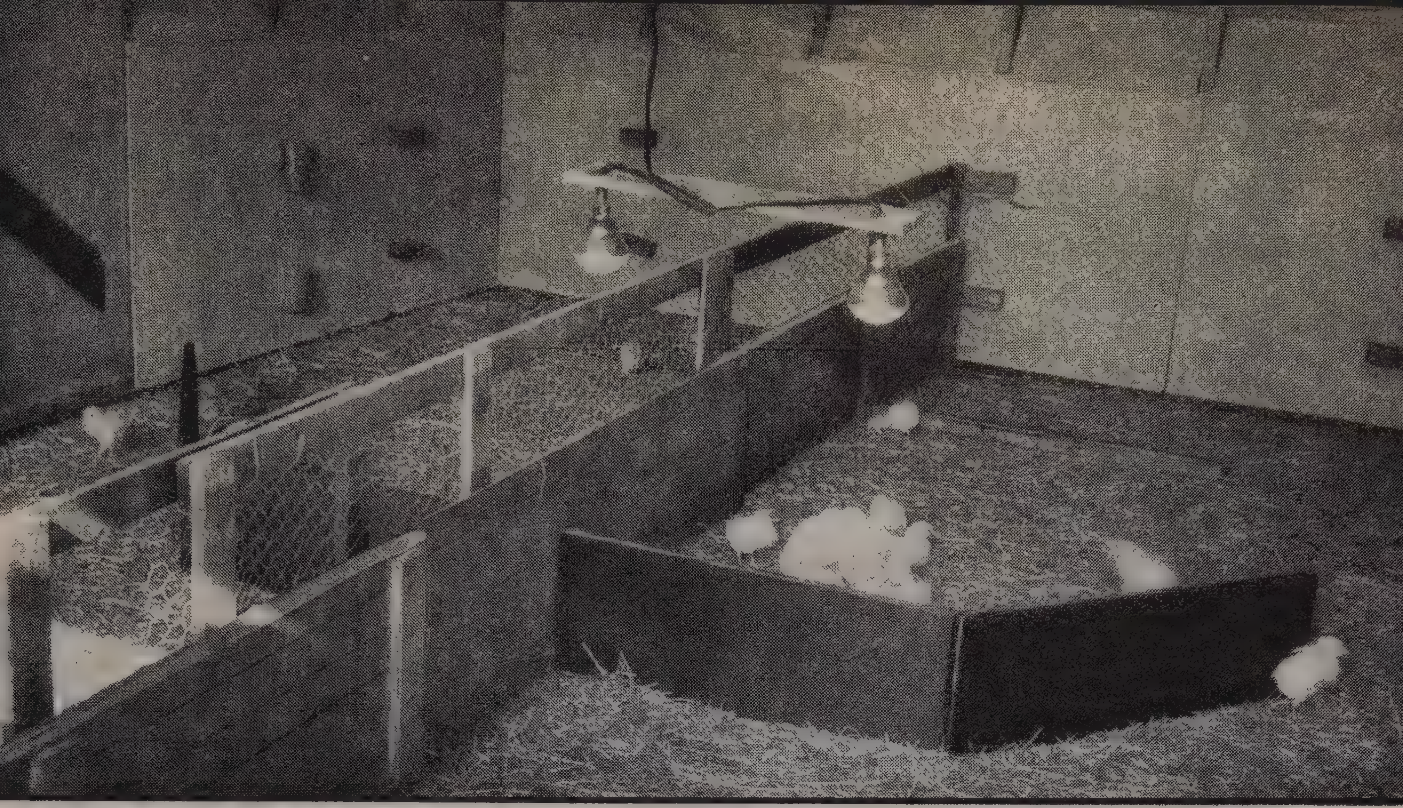

A general view of the layout and conditions of management in trial No. 2 at the Poultry Demonstration Plant, Upper Hutt.

Symptoms

The early signs of the condition are usually observed between the third and fourth weeks, especially around the twenty-first or twenty-second day, and the train of symptoms is fairly constant. At first there is a fairly sudden general loss of condition followed by evidence of leg weakness in individual chicks, which move around with a stiff, stilted gait. Leg weakness develops into inability to stand upright and a tendency to huddle in a corner or under the source of heat. A number of deaths may occur at this stage.

A swelling on the breast which extends along the wings and down the abdomen and legs and is due to fluid collecting under the skin may occur. The swollen area usually appears greenish blue or purple. In some outbreaks the appearance of a swelling at the back of the head has been a prominent feature. This may also be observed in survivors at the age of 8 to 9 weeks. It has been reported that release of the fluid under the skin by incising the swollen part often leads to the recovery of the chick.

Post-mortem Report

When a fresh carcass was opened the fluid under the skin was immediately obvious from the glistening wet appearance. Usually it was coagulated to form a jelly-like covering of the muscles of the breast and abdomen, which varied from yellow to a dark blue.

Tiny hemorrhages were usually prominent on the muscle surface, and the fat tissues appeared abnormal. Small, grey-white streaks on the muscle were evident, indicating severely damaged or dead muscle fibres.

Experimental Work

To ascertain the correctness of the assumption that X chick disease was similar to the vitamin E deficiency condition known as exudative diathesis some trial treatments of affected birds were necessary.

A batch of chicks 24 days old showing early signs of the disease was transported by air to the Department of Agriculture's Animal Research Station, Wallaceville. Special arrangements for dispatch and reception cut down delay on the journey, and the birds appeared to be none the worse for the trip. Two birds died shortly after arrival, and post-mortem examination confirmed the cause of death as X chick disease. Of the survivors at least 30 per cent. showed typical symptoms of the condition. A supply of the mash and grain used during the rearing of the chicks was also received.

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Trial No. 1

The birds were divided into 3 groups and placed in battery brooders to try the effect of vitamin E against X chick disease. The three groups were fed on the same diet as they had been receiving since the day old stage.

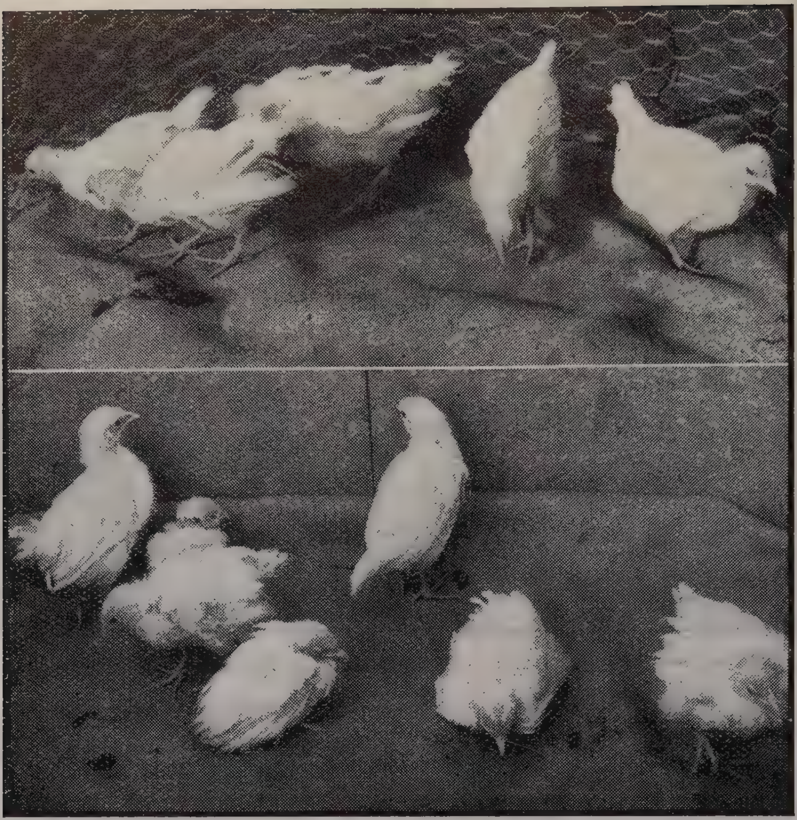
The birds in group 1 were dosed with pure vitamin E (dl alpha tocopherol), those in group 2 were the controls and received no special treatment, and those in group 3 were fed aureomycin mixed with the mash. The aureomycin was included because of a report that it had been successfully used to treat the disease on one farm.

The result of this trial is shown in the following table:—

TABLE I

Group	No. of chicks	Treatment	No. of deaths	Percentage of deaths
1	12	Pure vitamin E	1	8.3
2	18	Controls	9	50.0
3	11	Aureomycin	5	45.5

As the numbers of birds in the groups were not equal, the percentage death-rates give a clearer picture of the results. The only death in the group treated with vitamin E was a bird which was very badly affected before the trial started and which died on the second day.



Contrast in general condition between birds from the group treated with vitamin E (upper) and the control group (lower).

Apart from the difference in mortality, the appearance of the treated birds in group 1 was greatly superior to that of the untreated birds (group 2). (See illustration above.)

The birds treated with aureomycin (group 3), showed increased growth and weight, but the death-rate was almost as high as that of the untreated birds.

These encouraging results justified a further experiment on the use of vitamin E for prevention and cure of the condition, and a second trial was set up at the Poultry Demonstration Plant, Upper Hutt.

Trial No. 2

To obtain further proof that the condition was a nutritional disease an attempt was made to produce the condition in chicks. At the same time one group was fed vitamin E to show that it was of value in protecting against the disease.

Two batches of 50 chicks from separate hatches at the Poultry Demonstration Plant were set up in 4 pens containing 25 birds each. Pens 1 and 2 were from the same hatch and pens 3 and 4 were from a later hatch.

The diet consisted of standard chick mash No. 1 to which had been added crushed wheat, crushed maize, skimmed milk powder, and cod liver oil. This mash was brought in from a poultry farm severely affected by X chick disease. It was fed to all four pens, but the chicks in pen No. 4 had pure vitamin E added. Infra-red lamps were used for brooding.

The typical symptoms of X chick disease were reproduced, and the number of deaths in each pen are shown in Table 2 below:—

TABLE 2

Pen	Treatment	No. of deaths	Percentage of deaths
1	Special diet	14	56
2	Special diet	17	68
3	Special diet	20	80
4	Special diet plus pure vitamin E	6	24

One chick from each batch died before the fourteenth day from other causes.

The first symptoms were evident about the twenty-second day in pen 2. From information obtained since it seems highly probable that the death-rate in the treated pen would have been lower if a higher amount of vitamin E had been fed.

In both trials it has been shown that X chick disease can be prevented and possibly cured by the administration of vitamin E.

Cause of Vitamin E Deficiency

All the evidence shows that the disease is of nutritional origin and is probably a form of vitamin E deficiency. The next problem to be answered is which constituent of the feed is responsible for producing the shortage of vitamin E in the diet. The standard diet which contains wheat and other grains plus meat meal, milk powder, and green feed should contain sufficient vitamin E to supply the needs of the growing chick. It appears then that some factor or factors are present in the feed used which prevent the chick making use of the vitamin E actually present in the food, that is, something which has an anti-vitamin E effect.

It has been shown experimentally overseas that fish liver oils fed to excess can have this effect, but on many of the farms affected only the normal amount of oil was being fed.

An important point is that X chick disease has so far been encountered only in the South Island. The only obvious difference in diet constituents between the North and South Islands is the different source of wheat used. In the North Island most of the wheat is of Australian origin, whereas in the South Island it is largely home grown.

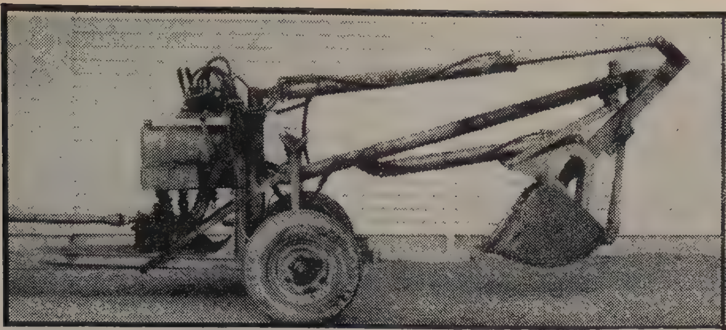
The home-grown wheat is usually harvested by combine machines and is frequently cut when wet. The grain is bagged by the machine and dumped on the field until it is convenient to remove and store it. During wet seasons the grain may be left bagged in the field for a considerable period, and sprouting will begin. In a number of samples observed the sprout appeared to have dropped or withered off, leaving a small black spot. The high moisture content may also cause heating during storage, and there is also the possibility that the wheat may be affected by moulds.

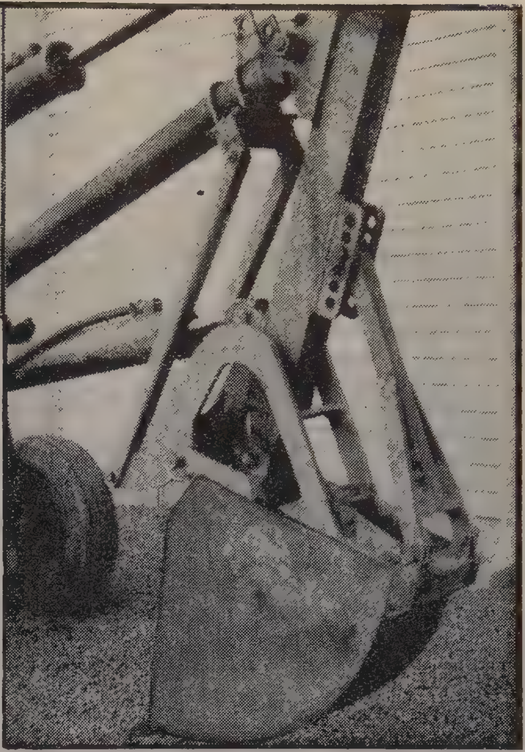
If this grain contains a substance or factor which affects the vitamin E normally present in poultry feedstuffs, it may offer some explanation of the outbreaks of X chick disease being confined to the South Island.

To test this theory another experiment was carried out using a batch of wheat obtained from an Invercargill poultry farmer who had suffered losses from X chick disease. Although the results of this experiment have not yet been fully assessed, the fact that a number of deaths occurred from typical X chick disease in the trial pens lends support to the theory that certain batches of wheat are responsible.

Further work remains to be carried out before a positive statement can be made as to the actual role played by the wheat in the production of the disease. The present findings, however, justify the Department of Agriculture advising poultry farmers who have suffered loss from this disease to feed 5 per cent. of wheat germ meal or a mash containing vitamin E in another form such as dl alpha tocopherol.

A brief summary of the position therefore is that an unidentified chick disease occurring only in the South Island has been investigated and has proved to be of nutritional origin. The disease can be prevented by supplementing the diet with vitamin E in the form of 5 per cent. of wheat germ meal, or with dl alpha tocopherol (pure vitamin E). The cause of the nutritional deficiency of vitamin E is not yet fully known, but there are good grounds for suspecting that it arises from feeding South Island wheat which has sprouted and overheated because of poor conditions of storage.



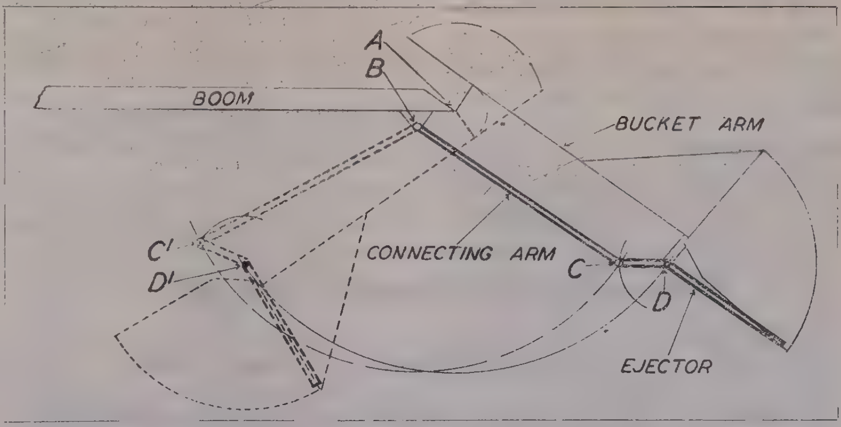


Self-cleaning Bucket for Hydraulically Operated Trench Diggers

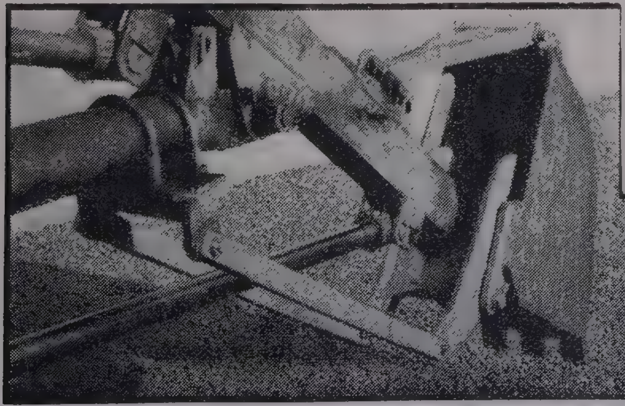
HYDRAULICALLY operated diggers or power shovels are becoming increasingly popular and there are now several makes on the market. Driven by any medium-horsepower tractor they have many uses on the farm, but this article by J. R. Chapman, Assistant Drainage Advisory Officer, Massey Agricultural College, Palmerston North, is confined to discussion of the use of the back hoe assembly for trenching, more especially for digging narrow trenches suitable for field tiles.

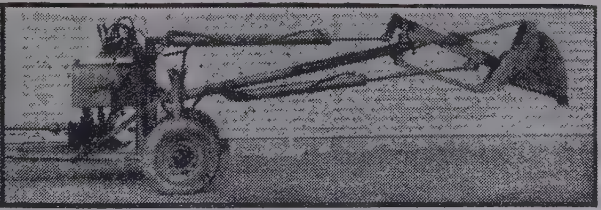
EXPERIENCE has shown that in anything but a free-running soil the operator of a trench digger has difficulty in emptying the bucket. This difficulty may not be very apparent when a wide bucket, say 24in., is being used, but it becomes accentuated when a narrower bucket is used. The farmer considers it desirable to use as narrow a bucket as possible to reduce not only the cost of digging but also the amount of material to be backfilled. Various methods were tried to overcome this difficulty, including the use of skeleton buckets, but eventually it became clear that some positive way of ejecting the spoil was necessary.

A method was evolved whereby the movement between the boom and the bucket arm was used and, by appropriate linkage, transferred to a swinging ejector. The ejector consists basically of a pair of levers cranked to conform to the construction of the bucket and swung on lugs so positioned on the bucket frame that they cause the ends of the levers to sweep, as nearly as possible, the arc of the



Illustrations: At top left—Trench digger on completion of digging stroke. Top right—Close-up view of bucket and ejector. Note the position of the scraper, allowing a maximum load to be packed into the bucket, and of the ejector-connecting arm link, well clear of the bucket mouth. Above—Diagram showing arcs of movement. At left below—The ejector has moved through a quarter circle and the scraper is at the mouth of the bucket, having cleared the bucket and leaving the machine ready for the next digging stroke (below).





back of the bucket. These levers are joined by a steel plate which forms the scraper, cleaning the bucket after each working stroke. The point of attachment to the bucket frame becomes the fulcrum and the levers project to link with the connecting arms. Care was taken to make the whole ejector very rigid and to provide an ample bearing surface at the fulcrum point. The connecting arms, designed to take compressive as well as tensile stress, are hinged to a yoke attached to the boom.

Action of the Ejector

The action of the ejector assembly is entirely automatic and requires no modification of the normal controls or change in the work cycle. When the digging stroke has been completed and the bucket traversed clear of the trench the emptying stroke takes place as shown in the diagram on page 273. The whole assembly has been outlined in both loaded and empty positions, and arcs show the movement of the ejector linkage in the course of the stroke. During the emptying stroke the ejector fulcrum point moves along an arc centred at A from D^1 to D. At the same time the point at which the ejector is linked to the connecting arms travels from C^1 to C along an arc centred at B. As these arcs have different centres, a movement of C about D is caused. In this way the application of force to C operates the ejector. During the digging stroke the ejector action is reversed, allowing the bucket to be filled to capacity.

The position of the boom yoke and dimension of the connecting arms and ejector must be suited to the particular make of machine and the size of bucket to be used.

Acknowledgment

The help and advice of A. A. D. McGregor, Head of the Engineering Department, Massey Agricultural College, in the design and manufacture of the prototype are acknowledged.

Radio Broadcasts

RADIO broadcasts to farmers will be given during October as follows:—

1YA Auckland, 7 p.m.

7 October—"New Zealand Grassland Association", by S. H. Saxby, secretary, New Zealand Grassland Association, Wellington.

14 October—"Silage Making", by G. B. Haddow, Instructor in Agriculture, Department of Agriculture, Auckland.

21 October—"First Considerations in Beekeeping", by E. Smellie, Apiary Instructor, Department of Agriculture, Auckland.

28 October—Y.F.C. session, by Waitemata district committee of New Zealand Federation of Young Farmers' Clubs.

1XH Hamilton, 12.33 p.m.

1 October—"Mastitis Control", by D. W. Caldwell, Veterinarian, Department of Agriculture, Hamilton.

8 October—"Supplementary Crops", by H. M. Bull, Instructor in Agriculture, Department of Agriculture, Hamilton.

15 October—"The Meat Board Electoral College", by H. A. Wagstaff, Federated Farmers, Hamilton.

22 October—"Aspects of Spray Irrigation of Pastures", by P. F. Noble, Department of Agriculture Soil Research Station, Rukuhia.

29 October—"Remedies for Quality Faults in Milk and Cream", by E. P. Carter, Special Inspector, Department of Agriculture, Hamilton.

1YZ Rotorua, 7.15 p.m.

1 October—"Rearing and Weaning of Calves", by P. J. McCann, Veterinarian, Department of Agriculture, Hamilton.

15 October—"Tanker Collection of Milk", by G. Purvis, Superintendent of Butter Instruction, Department of Agriculture, Hamilton.

29 October—Y.F.C. talk, by Western Bay of Plenty district committee of New Zealand Federation of Young Farmers' Clubs.

2ZA Palmerston North, 12.34 p.m.

5 October—"Cattle, Seasonal Stock Notes", by A. W. Hart, Veterinarian, Department of Agriculture, Palmerston North.

12 October—"Value of Silage in the Manawatu", by J. A. Graham, Fields Instructor, Department of Agriculture, Palmerston North.

19 October—"Feed Flavours", by L. W. Scott, Farm Dairy Instructor, Department of Agriculture, Hastings.

26 October—Y.F.C. session, by I. G. Tabor.

3YA Christchurch

1 October (7.15 p.m.)—Review of the "New Zealand Journal of Agriculture", by E. G. Smith, Fields Instructor, Department of Agriculture, Rangiora.

8 October (7.15 p.m.)—"Look to Those Chicks", by J. Jones, Poultry Instructor, Department of Agriculture, Christchurch.

15 October (7.15 p.m.)—"Soil Mixtures for Seed Sowing", by M. G. Baumgart, Horticultural Instructor, Department of Agriculture, Christchurch.

4YA Dunedin, 9.15 p.m.

7 October—"Organisation within the Honey Bee Colony", by I. W. Forster, Apiary Instructor, Department of Agriculture, Oamaru.

4YZ Invercargill, 7.15 p.m.

6 October—"The Potato Crop", by A. R. Rankin, Fields Instructor, Department of Agriculture, Invercargill.

13 October—"Factors in Designing Drainage Systems", by K. Mayo, Drainage Advisory Officer, Department of Agriculture, Invercargill.

20 October—"Small Seed Production", by R. W. Bush, Fields Instructor, Department of Agriculture, Invercargill.

27 October—"Silage", by C. D. Denize, Instructor in Agriculture, Department of Agriculture, Invercargill.

Regular Sessions

1XH Hamilton, Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (Waikato stock review).

1XN Whangarei, Mondays at 8.1 p.m., Wednesdays at 8.1 p.m. (Northland stock market report), Fridays at 8.1 p.m.

1YA Auckland, Mondays at 7 p.m. (Auckland stock market report), Tuesdays at 12.35 p.m., Wednesdays at 7 p.m., Thursdays at 12.33 p.m.

1YD Auckland, Thursdays at 7.30 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock review), fortnightly on Tuesdays at 12.33 p.m. (Federated Farmers' session), Tuesdays at 6.55 p.m. (Frankton stock market report), Thursdays at 12.33 p.m., Thursdays at 7.15 p.m. (farm talks alternating with session for Bay of Plenty farmers), fortnightly on Fridays at 12.33 p.m. (pig council talk).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m.

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawkes Bay orchardist session), Tuesdays at 7 p.m., Wednesdays at 7.10 p.m. (Hawkes Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Tuesdays at 8 p.m., Thursdays at 8 p.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Thursdays at 12.33 p.m.

4YA Dunedin, Wednesdays at 7.20 p.m., Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m. and 7.15 p.m., Tuesdays at 7.15 p.m. (Farm and Country session, including Lorneville stock market report), Thursdays at 12.33 p.m.

Meteorological Records for July

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	50.4	— 0.1	66.2	30.0	8.00	22	+ 0.61	2.55	4	146.7
Auckland	160	51.9	+ 0.5	64.8	36.1	7.58	17	+ 2.12	2.93	4	122.8
Tauranga	10	48.1	— 0.6	62.8	28.2	7.92	15	+ 2.88	3.05	4	146.5
Ruakura	131	46.1	— 0.4	61.0	23.5	8.50	16	+ 3.77	4.05	4	121.3
Rotorua	969	45.0	— 0.2	59.0	26.7	11.11	16	+ 6.47	3.50	4	135.9
Gisborne	12	47.3	— 0.9	64.4	25.9	1.42	14	— 2.99	0.28	27	125.8
New Plymouth ..	160	49.6	+ 0.7	62.8	35.0	5.94	18	— 0.42	1.05	19	152.5
Napier	5	47.8	+ 0.5	64.9	28.4	1.25	11	— 2.18	0.58	4	133.9
Karioi	2125	40.2	— 0.2	60.0	22.0	3.49	17	— 0.70	0.71	5	
Wanganui	72	47.6	+ 0.0	62.4	28.6	3.02	19	+ 0.10	0.70	5	134.3
Palmerston North .	110	45.8	— 0.3	61.0	28.2	3.05	18	+ 0.01	0.62	5	107.0
Waingawa	350	45.1	+ 0.6	62.0	23.0	3.24	19	— 0.70	0.79	5	106.3
Wellington	415	47.2	+ 0.9	58.8	35.0	4.13	19	— 1.23	1.03	19	107.2
Nelson airfield ..	5	43.4	+ 0.1	58.0	24.0	3.27	13	+ 0.04	1.06	18	172.3
Blenheim	12	44.2	— 0.4	60.2	26.1	2.21	10	— 0.40	0.60	19	191.3
Hokitika	12	43.8	+ 0.2	61.6	27.4	9.30	14	+ 0.80	1.56	23	122.5
Hanmer	1225	38.8	+ 0.3	59.0	17.2	1.72	14	— 2.48	0.55	5	116.7
Christchurch ..	22	42.6	+ 0.3	67.6	24.8	2.27	13	— 0.33	0.71	5	138.0
Ashburton	323	40.8	— 0.3	60.8	24.0	1.52	7	— 1.10	0.48	10	143.4
Timaru	56	41.3	— 0.1	63.9	27.2	1.18	7	— 0.55	0.47	19	154.9
Alexandra	520	36.4	+ 0.0	62.8	20.6	0.32	6	— 0.34	0.14	10	115.4
Taieri	80	41.2	+ 0.2	59.8	23.9	0.79	13	— 1.15	0.22	26	109.6
Invercargill airfield	0	40.4	— 0.1	57.6	23.8	2.25	15	— 0.56	0.61	9	95.6

HEADING PHOTOGRAPH: A mass display of stock. Campbell Photography photo.

Spring Bedding Plants for Flower Garden

TO give a bright show of flowers for the late spring and summer it is necessary to plan the bedding scheme early so that plant requirements can be arranged. Because of the number of annuals available for bedding out, a bright and varied show can be obtained. In this month's article the preparation of beds and plants used is discussed by R. R. White, Horticultural Instructor, Department of Agriculture, Dunedin. The section on flower garden work for October is by H. P. Thomas, Horticultural Instructor, Department of Agriculture, Wanganui.

IN the preparation of a bedding scheme it is necessary to give some thought to the layout so that the display is both colourful and harmonious. It is essential to take into account the position of the bed, whether it will be shaded or not, and whether the background will blend or clash with the bed. Next to be considered is the colour scheme. Usually a bright display is preferred with a predominance of orange, yellow, and red. Plant habit should next be studied in relation to the shape of bed. In beds where there is a background available taller species should be set at the back, and low-growing compact species at the front. Where the bed is situated in a lawn a mass display with the use of one colour and species is probably the best.

Bedding Plan

When the gardener has decided on the best site for his bedding scheme his next move should be to draw a plan of the area, in which the information gathered previously is put together. The plants can be arranged in informal groups or formal strips. The gardener must remember the spacing required between plants so that they completely cover the area when fully grown. In the informal border the groups should be arranged to give a show of colour at one time or to give a series of group colours over a longer period. Annuals, or plants treated as such, are the best type to use. Annuals are plants which grow from seed, flower, and die in the one season. However, there are a number of other plants which are biennial in nature, but are usually treated as annuals.

Spring Bedding out Plants

Plants that Can Tolerate Partial Shade

Antirrhinum
Clarkia
Eschscholtzia
Godetia
Petunia
Viola

Dwarf Border Plants

Ageratum
Alyssum
Antirrhinum nanum
Calendula
Celosia
Clarkia
Coreopsis
Eschscholtzia
Godetia (dwarf)
Iberis
Lobelia
Mesembryanthemum
Nasturtium
Nemesia
Petunia
Reseda
Tagetes
Verbena (dwarf)
Viola

Plants for Carpeting

Ageratum
Alyssum
Antirrhinum (dwarf)
Iberis
Lobelia
Mesembryanthemum
Verbena

Plants for Edging

Ageratum
Alyssum
Godetia (dwarf)
Iberis
Lobelia
Matthiola (stock)
Mesembryanthemum
Nemesia
Tagetes
Ursinia
Viola

Tall Border Plants and for Screening Backgrounds

Antirrhinum majus
Godetia
Helianthus
Larkspurs
Lathyrus (sweet pea)
Lupinus
Nicotiana
Tropaeolum

Preparing the Bed

The next move is to lay out and prepare the bed. If the desired bed is to be rectangular or square, it will be necessary to have the adjacent edges at right angles to each other. This can best be done by making a triangle out of three pieces of timber 3ft., 4ft., and 5ft. long, or by tying together three pieces of string of those lengths. One of the short sides of the triangle is placed on one edge of the bed and the other edge can then be marked out. A circular bed can easily be marked out by using two pegs and a piece of string equal to the radius of the circle required. If an elliptical bed is required, two pegs joined by a long piece of string are needed. The two pegs are fixed, the string left loose, and an area is traced out by having the loose string tightened.

When the boundaries of the bed are established the next move is to prepare the soil for planting. Compost or animal manure or fertilisers such as superphosphate or blood and bone should be dug in well before planting. A fertiliser dressing of about 2oz. per sq. yd., should be sufficient for most garden soils. The soil should be worked up to a good tilth before planting, and walking on the bed should be restricted as far as possible.

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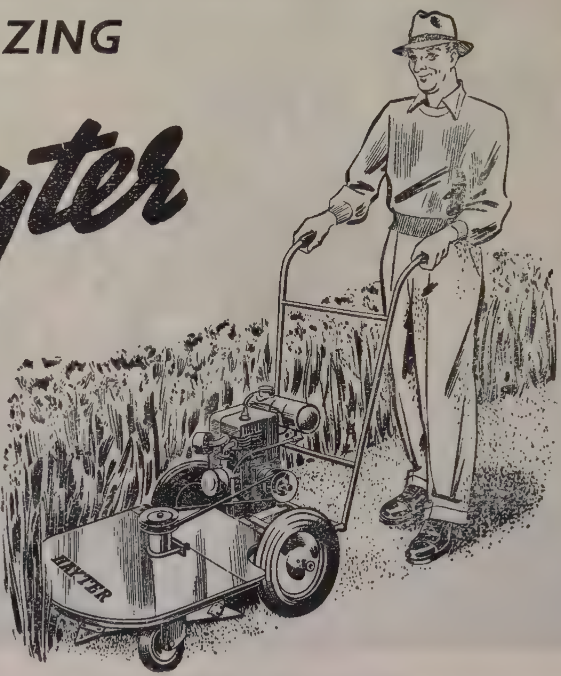

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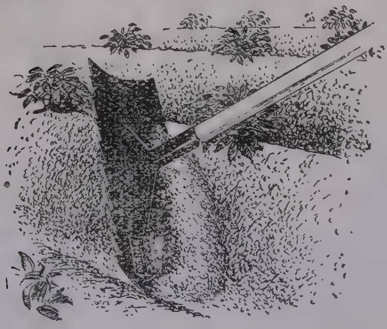

Illustrated is the Model D, with one rake side, one scraping side, and hoe tip, moulding potatoes.

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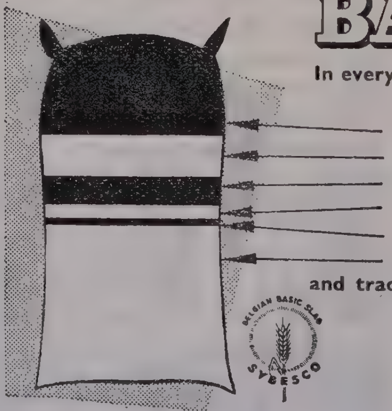

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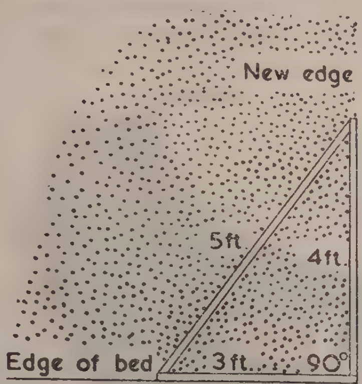
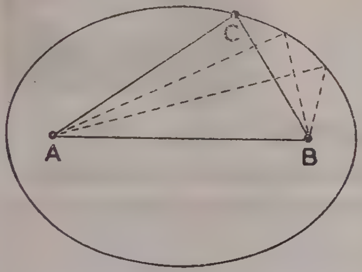
MARKING OUT FLOWER BEDS



Rectangular or square bed: The triangle, made from strips of timber or pieces of string, is placed with one short side on one edge of the bed and the other edge can then be marked out at right angles. Three pegs are necessary when string is used.



Oval or elliptical bed: The string is attached to two fixed pegs A and B and a marker peg C is used to trace out the boundary by keeping the string tight.

Planting the Bed

The bed should be marked out to show the spacing of the plants and position of the groups if these are used. Marking can be done by using a cord and making marks at regular intervals. Another method is to have small pieces of string or tape knotted on the cord at the distance of spacing between the plants. The areas for different groups can be marked out by pegs. Planting should be done by beginning at the back or one side of the bed and working across it. With circular or oval beds planting may be started in the middle. After the beds have been marked the plants should be carefully lifted from the box and placed one row at a time in their approximate planting positions. It is necessary to have well-grown plants that have been well hardened off, as their new conditions will be much more rigorous than those in the nursery. When the plants are lifted from the box as much soil as possible should come with the roots. Tools required for planting are a trowel and a rake. Planting is done by taking the plant in the left hand, the trowel in the right hand, and facing the back of the bed or side of starting. The hole, larger than the plant's rooting system, is dug with the trowel so that the soil is brought back toward the planter. The plant is then placed in the hole and the soil pushed back around its roots and firmed with the hands or feet, a procedure which is continued along the row. After the first row is planted the ground where the planter has been walking is raked over and the next row is then planted. Should the ground be dry the plants can be watered in during planting, or a thorough soaking with a hose can follow planting. The hose used should have as fine a spray as possible, and the hosing should be of at least an hour's duration so that the water soaks in well.

Maintenance of the Bed

There should not be much maintenance required apart from weeding and hoeing the surface. Care should be taken when using a hoe not to damage the plants, as this may allow the entry of disease organisms. With some of the longer flowering annuals, picking over should be done to maintain a continuing supply of flowers. A side dressing of blood and bone or liquid manure should prove beneficial during the period of growth. Tall-growing plants which are liable to be damaged by wind should be staked and tied. A single stake can be so placed that the plant hides most of it and it will not mar the display.

Diseases and Pests

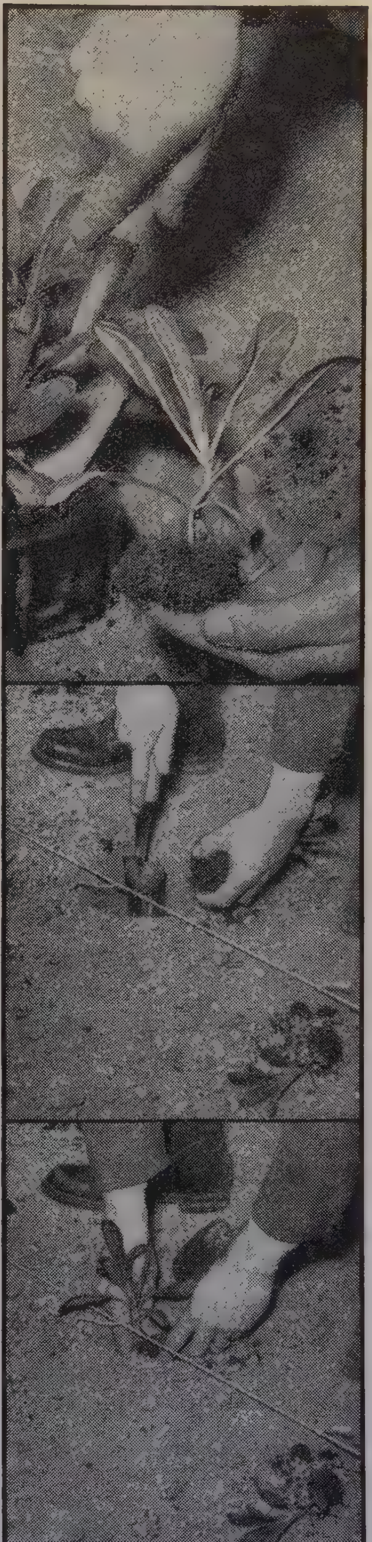
Few diseases trouble beds of annuals, but perhaps the most destructive is collar rot (*Phytophthora* sp.). This is a soil-borne fungus which thrives in badly drained positions. Symptoms shown by the plant are wilting followed by death. The affected plant usually rots around the soil level. Control is by improving drainage, pulling out and destroying infected plants, and by watering the area affected with a Bordeaux mixture 3 : 4 : 50.

Rust is another disease which attacks some bedding plants. This is a fungus which is usually found as brownish spots or rings on the under sides of leaves. Sulphur-based sprays should be applied, care being taken that the under sides of the leaves are covered.

Pests found on bedding plants are usually aphides and thrips, though in the North Island the green vegetable bug may prove troublesome. Aphides and thrips can be controlled with nicotine sulphate 1 : 600, and they and the green vegetable bug can be controlled with Hexaethyl tetraphosphate (H.E.T.P.) 3/5 fl. oz. to 4 gallons of water. Both of these sprays require a spreader. Care is necessary in using these, as they can prove harmful to the operator. They should not be inhaled, and rubber gloves, goggles, and protective clothing should be worn as a safeguard against absorption through the pores of the skin.

As H.E.T.P. may cause damage to some plants, it would be advisable to spray one or two plants and observe them for several days to ensure that it is safe to spray the rest.

Other pests usually found harmful, especially when the plants are small, are earwigs, woodlice or slaters, and slugs. These usually live under rubbish and so the best control is to remove any such harbouring material. Earwigs can be trapped in screwed-up paper which can then be burnt. A spray of D.D.T. on the plants is very effective against earwigs and slaters. Slugs can be controlled with the use



[*Campbell*

Upper—As much soil as possible should adhere to roots of lifted plants. Middle—Hole should be larger than plant's roots. Lower—Soil should be firmed with the fingers.

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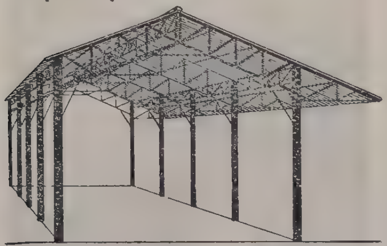

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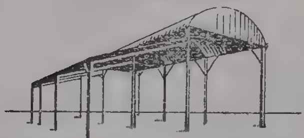

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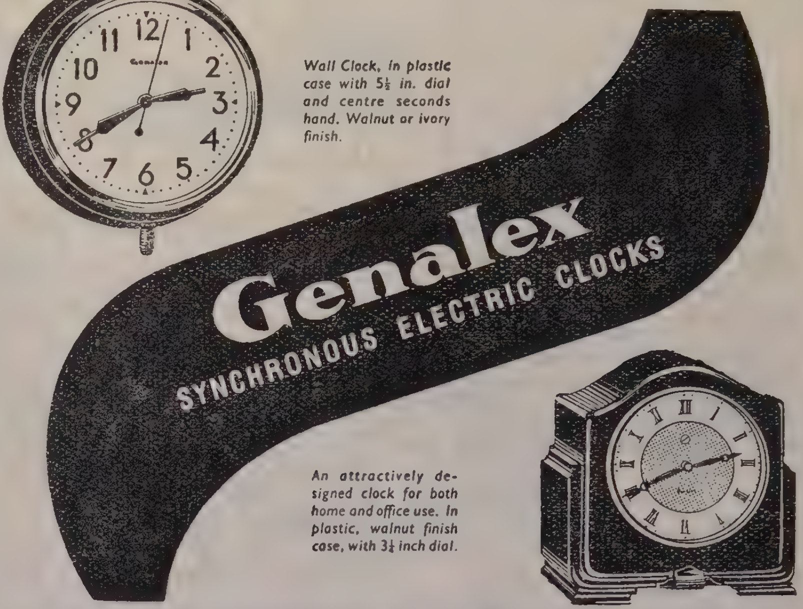

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of baits of metaldehyde and bran, which paralyse the pests and they can then be gathered up. Another method, though somewhat tedious, is to hunt these nocturnal pests with a torch and drop them into a solution of salt and water.

Garden Work for October

The important operations of sowing, pricking out, planting out, and potting on will absorb much of the home gardener's time and interest in the flower garden during October.

The distinction between hardy and half-hardy annuals loses much of its meaning in the milder districts where frosts do not occur and where nurserymen raise both in boxes and term them bedding plants.

Half-hardy annuals may still be sown and raised under glass if sufficient have not already been provided for.

Sowings of such bedding plants as petunia, salvia, and aster are often made this month to coincide with improved conditions for planting out.

Young half-hardy bedding plants raised earlier in glasshouses or frames should be progressively hardened off by gradually reducing heat and by leaving the ventilators open, first in the day and then at night. After several days of this they should be removed to a cold frame, the covering of which can be left off in the daytime and not fully closed at night, unless frosty, unseasonable weather is experienced. The plants will thus have become accustomed to outdoor conditions by the time they are required for planting out.

Certain hardy annuals, however, prefer to be sown directly into their flowering positions in beds or borders and where these can be accommodated some of the following should be sown now: Mignonette, virginia and night-scented stock, nasturtiums, shirley poppy, linum, linaria, nemophila, clarkia, and godetia.

Annuals sown outdoors in beds or borders last month should now have germinated and be growing strongly. As soon as they are large enough to be recognised they should be thinned out first to 2 to 3in. apart each way and again later to a final spacing of 8 to 12in. apart according to the ultimate habit of the plant. Some of these young plants, if removed with care, may be used for transplanting.

In northern districts many bedding plants may now be planted out from their boxes when they are considered to be of sufficient hardiness.

The boxes should be watered a few hours before the removal of the plants to avoid any check by dryness or the loss of excessive soil from round their roots. The use of a small flat-bladed trowel is also recommended to minimise damage and assist in the taking of as much soil as possible with each plant. In general bedding plants should be set out from 8 to 15in. apart each way.

This final planting into the garden should be done on an overcast day if possible to avoid excessive wilting. Hot and windy days should be avoided and the work done in the late afternoon rather than in the heat of the day. Watering the plants before transplanting is usually beneficial.

In some instances premature flower buds may be showing at the time of planting out. These should be removed to promote a well-branched plant and a maximum display of flowers later on.

Chrysanthemums

October is the month recommended for planting chrysanthemums in most districts. The situation should be sunny and well drained, with some shelter from the prevailing wind. Preparation of the bed or situation in the border should be started as soon as the old stools are discarded.

As most garden soils lack humus, a generous application of compost or well-decayed animal manure should be incorporated during digging to ensure healthy, sustained growth. In addition a dressing of a complete garden fertiliser at 2oz. per square yard should be hoed in a week or two before planting out.

[Douglas Elliott

Antirrhinums are perhaps the most popular of all bedding plants.

Chrysanthemums should be planted firmly and 18in. allowed between each plant if they are to be grown in a bed of their own. In the flower border it is best to set them out in clumps of 3 or 4 plants of the same variety 15 to 18in. apart, as this method is much more effective and gives more colour than if they were planted as single specimens.

To produce sturdy, branching plants growths should be first pinched back when the young plants reach a height of 6 to 8in. If plants are allowed to grow naturally, they are inclined to become tall and ungainly with spasmodic flowering periods.

The plants should be tied to reasonably sized stakes or canes as growth progresses, with loose encircling ties firmly secured to the supports.

If desired, a few plants of chrysanthemums may be potted up for flowering indoors in autumn.

Dahlias

Dahlias may now be planted out in all but the coldest districts. In those districts subject to late frosts it is advisable to keep the plants in a frame a few weeks longer, but they should be gradually hardened off by keeping the sashes off in all but the most inclement weather. For time of planting the home gardener would be well advised to be guided by soil and weather conditions rather than by the calendar. The beds or borders for dahlias should have been deeply dug and liberally manured with farmyard manure in the autumn. This should be followed in the spring by a dressing of lime and bonedust, which can be worked in when the ground is being prepared for planting.

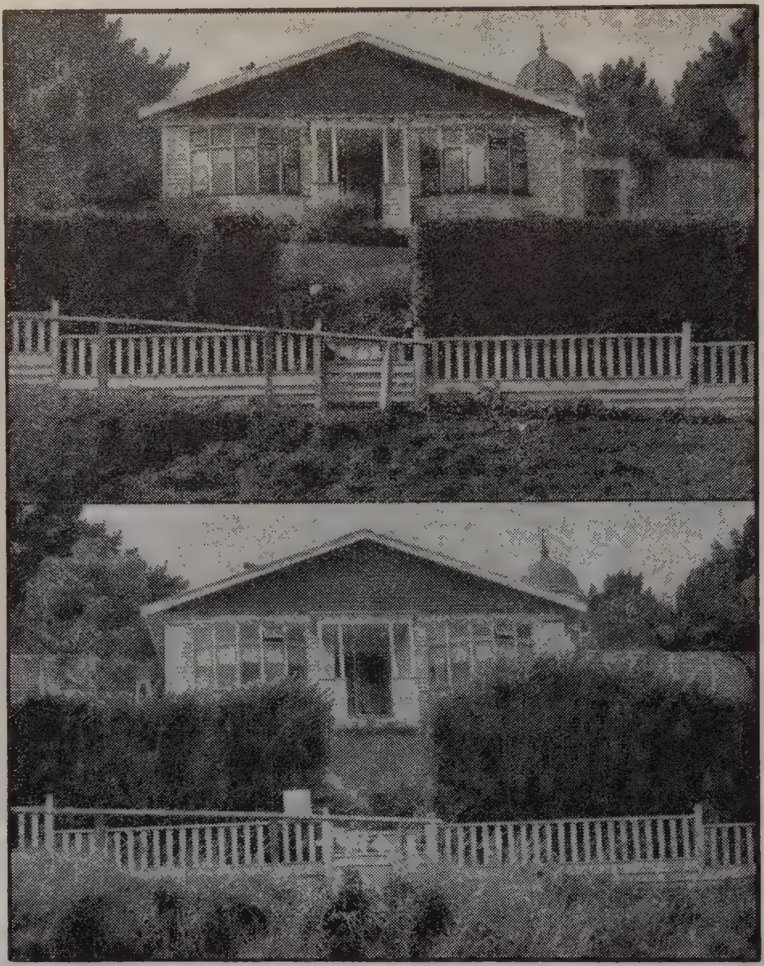
If this was not done, holes 18in. square and 2ft. deep could be dug, and into each of them could be put two forkfuls of well-rotted farmyard manure. The manure should be mixed with soil, the holes filled in, and a handful of bone meal added to each hole.

The dwarf kinds can be planted 18in. to 2ft. apart, the medium growers 2 to 2½ft. apart, and the strong growers 2½ to 3½ft. apart. If sufficient space is available, care should be taken not to err on the side of overcrowding. The plants should be staked early and be tied up regularly. During dry weather they will require watering, preferably with liquid manure, once a week, and a light mulch of stable manure or lawn clippings later in the year will help to conserve moisture.

Making a plan in advance of setting out the plants and inserting strong stakes of the right height in the positions where the plants are to go are to be recommended.

Gladioli

More gladioli corms for a succession of blooms should be planted out as described last month. Plantings of gladioli may be used to form colour schemes in the border and they may



Smartening Frontages for the Royal Visit

BANKS covered with long, matted grass look most untidy. They should be cut with a reap hook and the old grass put on the compost heap. If the bank is very rough, it pays to grade it, sow it with grass seed, and then keep it mown with a machine if it is not too steep. Hedges should be trimmed neatly. The hedge shown here is escallonia, which will stand hard pruning to bring it back to shape, but coniferous plants (*Cupressus* spp., etc.) will die if cut back into bare, old wood. The best way of all of smartening up a frontage is to set out a row of flowers at the foot of the fence or hedge. The most satisfactory flowers for this purpose are pot marigolds (calendulas), geraniums, and pelargoniums. They will all stand the dry conditions that usually occur in summer at the base of a hedge, where the roots of the hedge plant take much of the moisture from the soil. It is essential to dress these outside borders with complete fertiliser and compost before planting, and annually thereafter, as the soil will usually have been much impoverished by the hedge.

For a patriotic planting, red geraniums, white alyssum, and blue lobelias make a mixture which may be old-fashioned but is hard to better for a strip of bright colours in a narrow border.

be used satisfactorily with sweet alyssum, myosotis, or *Phlox drummondi* as a ground cover.

Bulb Foliage

The foliage of spring-flowering bulbs will now be looking neglected and untidy, and rather than remove it by cutting, which is not recommended, it should be twisted tidily into a bunch to be removed only when it comes away easily.

Planting out

Insure against a dearth of flowers in later summer by beginning to plant at intervals as space becomes available such plants as geraniums, gaillardias, calendulas, paris or tree daisies, hybrid wallflowers, alyssum, *Salvia horminum* (clary), and coreopsis.

Pot Plants

Pot plants such as fuchsia, begonia, gloxinia, pelargonium, geranium, and hyrangea now growing strongly should be potted on if necessary and fed regularly with liquid animal manure diluted to the colour of weak tea.

Alternatively the following fertiliser mixture may be used once a fortnight at the rate of ½ teaspoon for each plant in a 5 or 6in. pot or a level teaspoon for larger pots: 6 parts of sulphate of ammonia, 3 parts of superphosphate, and 1 part of sulphate or muriate of potash mixed with its own bulk of dry sand.

Herbaceous Border Plants

Herbaceous plants, particularly those which have been in the same position for a year or two, often produce far more new shoots than are required for best results.

To avoid the overcrowding of growths which leads to smaller flowers and conditions suitable for the establishment of pests and diseases, as soon as practicable all weaker growths should be thinned out first, and finally the remainder should be thinned to a reasonable number in accordance with the vigour of the plant.

Polyanthus and Primroses

In the earlier districts primroses and polyanthus may be increased by root division as soon as they finish flowering. If they were mixed plants raised from seed, ensure that only the best are propagated by marking them before they finish flowering. The selected plants should be lifted carefully with a fork and the soil shaken from the roots. With the fingers or possibly a knife they should be divided into portions having one or two crowns or rosettes of leaves and an even share of roots. They should be planted 9in. to 1ft. apart in a partially shaded, draught-free border enriched with organic material such as farmyard manure or compost.

Water Lilies

During October is an opportune time to lift and divide water lily plants which may have outgrown their pools. They should then be replanted in renewed soil composed of equal parts of good garden soil, well-rotted animal manure, and sharp sand. While the water lilies are out it is a good opportunity for cleaning out the pool, but the roots of the plants must on no account be allowed to dry out.

Weeds

Weeds will be germinating and growing vigorously and every opportunity must be taken to eradicate them when they are young.

If they get to the seeding stage, it is then necessary that they be removed instead of left lying on the ground. Weeds such as groundsell, shepherd's purse, ground cress, and chickweed, even when cut, have sufficient sustenance left in them to ripen the seeds which have already formed.

Draperies and Curtains

By MOLLY MACPHERSON, Field Officer in Rural Sociology, Department of Agriculture, Auckland

DRAPERIES and curtains are an important investment in both time and money. Therefore careful planning and workmanship are necessary from the time of choosing the fabric until the sewing and pressing are done and the draperies and curtains are hung.

THERE is a growing tendency to simplify window treatments, and save in exceptional cases the rich, heavy draperies with interlinings and ornamental valances are giving way to lighter fabrics, which are more hygienic, easier to make up, and easier to keep clean. Aesthetically curtains are necessary to frame a window and to give a unity between walls and windows; they are necessary for the more practical purposes of giving privacy, preventing glare without excluding light, and sometimes to correct or obscure bad proportions, ugly woodwork, or an ugly outlook.

Choosing the Fabric

It is possible to buy pre-shrunk material for curtains or draperies. If the material is not pre-shrunk, it is wise to wash it and thus shrink it before cutting it or to allow sufficient material for shrinkage when cutting. The extra allowance may be turned into the hem or may form a tuck at the heading or hem until the curtain is washed. The colour fastness of the fabric is also important, and many materials carry this guarantee, sometimes on the label and sometimes on the selvedge.

There are several points to consider when fabrics for curtains and draperies are being chosen.

For long, narrow rooms: The aim is to make narrow walls look wider and long walls look shorter. If the window is on the narrow wall, the size of the design and the colour of the fabric do not want to be too eye-catching, thus emphasising the narrow wall and the length of the room. If the window is on the long wall, the choice of design and colour may be bolder, which will help to disguise the length of the wall and the narrowness of the room.

For rooms with low ceilings the aim is to create an illusion of height. Floor-length curtains and draperies appear to add height to a room. If the curtains hang straight, the effect of heightening is still greater. A large design in the fabric has a dwarfing effect on the wall and horizontal stripes reduce the apparent height of the room (as do deep pelmets) by carrying the eye across instead of up and down. Cool colours such as blue and green give appearance of more space.

For rooms with high ceilings the aim is to bring the ceiling "down into the room". Bold patterns and splashy designs are in proportion to a high-ceilinged room. With stripes, horizontal stripes are preferable, as they appear to cut the height of a wall, and deep valances and pelmets break the height of a wall.

Small rooms: The aim is to make the rooms look as large as possible. Simple, straight-hanging curtains are best. Any distracting elements such as cross effects, ruffles, and valances tend to make a room seem smaller. The design in the fabric should be in proportion to the size of the room. Large patterns tend to overshadow a small room. Stripes will make a room seem higher or wider, whichever way the stripes are used. Plain-coloured draperies do not "break up" the wall expanse, and therefore make a room seem larger, particularly when a plain colour similar to the wall colour is used. Too many colours in a small room are distracting, whereas different tones of one colour (one tone may be used for the curtains) will suggest spaciousness and need not be dull.

Cool colours give apparent spaciousness and warm colours have the opposite effect and make a room appear cosier, but the choice of colours will be governed by other colours in the room. If patterned material is chosen, the pattern should harmonise with other patterns and colours in the room so that the over-all effect is well balanced in colour and pattern and the room has not an overwhelming amount of pattern or different patterns, whether plain, floral, striped, or geometrical.

Heading photograph by Sparrow.

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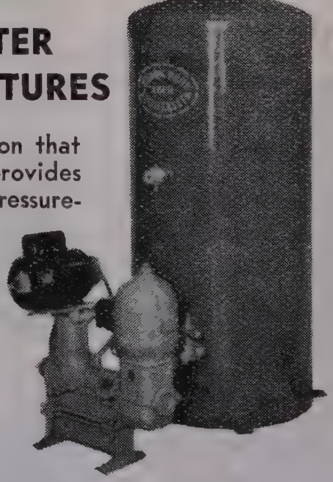

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Type of Fabric

The type of fabric is important.

For a cosy effect fabrics for draperies should be rough textured or gaily printed. The glass curtains may be of sheer rayon fabrics, provided they are full and ruffled.

To achieve a cool and airy effect fabrics for draperies in cool colours need to be smooth textured and feel cool and to have, through texture or pattern, the effect of airiness; sometimes draperies may be eliminated and curtains only used. On patterned fabrics a widely spaced design gives an appearance of coolness. The glass curtains need to be light and sheer. Both draperies and curtains should be simple in pattern and style.

For a formal and conservative room the fabrics for draperies and curtains should be quiet and dignified in pattern and generally of satin, brocade, damask, velveteen, or faille. The style generally should be heavy lined draperies in rich fabrics to floor length. The glass curtains need to be simple, formal, and in keeping with the draperies.

For a casual, informal room the fabric looks well if it is patterned or dull textured or has a novelty weave. The style should never be stiff and formal. Plain styles can look attractive and ruffles are suitable. In informal rooms unlined draperies may be used without glass curtains and often sill length is preferable. An informal room should be colourful, but in keeping with a definite colour scheme in the room.

Lengths

There are three proper lengths at which curtains and draperies may be hung: sill length, apron length, and floor length (see Figs. 1 and 2). Sill or apron lengths are used generally in informal living and dining rooms and in most bedrooms. Floor-length draperies are more formal.

Never hang curtains or draperies half-way between sill length and floor length.

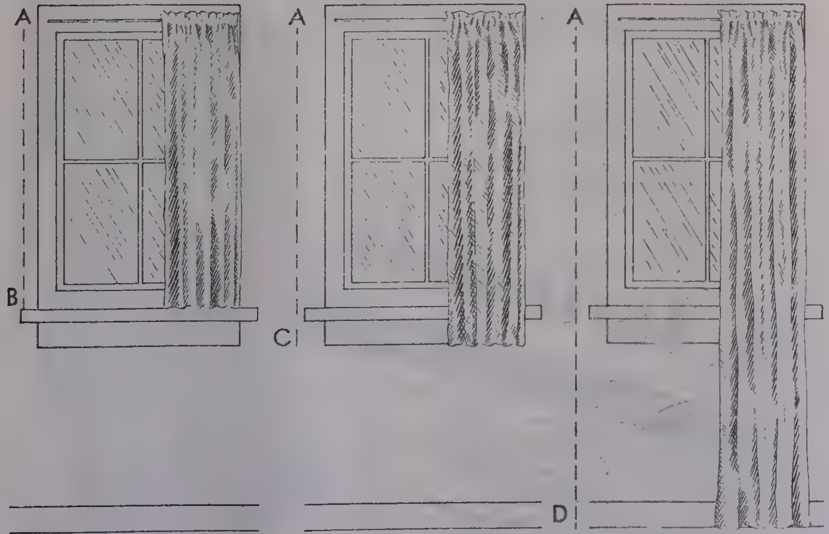

Fig. 1—Tailored curtains or draperies. AB—Sill length. AC—Apron length. AD—Floor length.

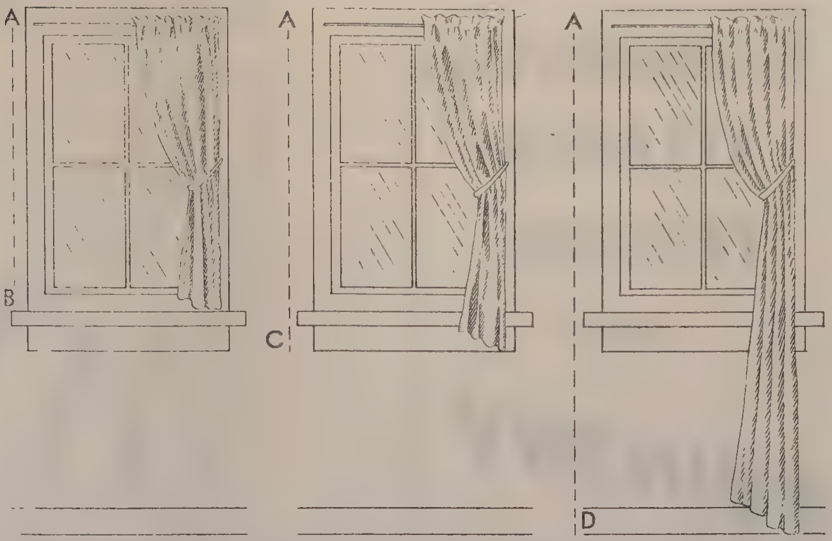

Fig. 2—Tie-back curtains or draperies. AB—Sill length. AC—Apron length. AD—Floor length.

Styles

Tailored curtains and draperies hang straight to whichever length is preferred. They require approximately a 1in. heading and a hem in proportion (1½in. to 3in.) to their length (see Fig. 1).

Tie-back curtains and draperies: With this style the tie-back raises the bottom of the curtain or drapery, but if an extra 1½in. is added to the proposed curtain length, the curtain or drapery will drape attractively to the proper length (see Fig. 2) when tied back.

Tier curtains or cottage curtains are double hung at the window (see Fig. 3), and hang straight, covering the whole of the window pane. When measurements are being taken for these curtains material has to be allowed for a heading and a hem on each tier.

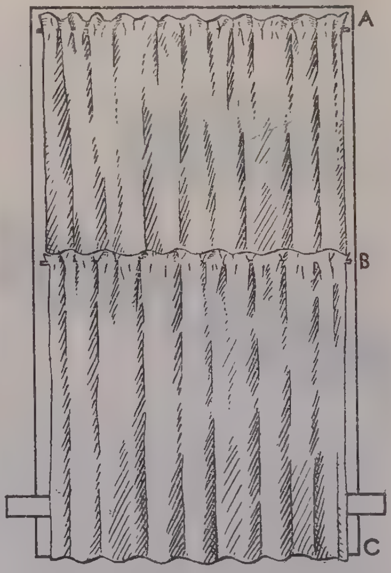

Fig. 3—Tier curtains; two lengths AB and BC.

Cross-over glass curtains may be fashioned to run on one rod and not two as is usually thought necessary (see Fig. 4). To fashion these curtains the two pieces of material for the curtains are placed over one another at an angle as in Fig. 5. The heading and seam allowances are folded down and sewn with two rows of stitching so that both curtains are attached at the top. The top outside corners of the curtains are cut off as is shown in Fig. 5.

Calculating Amount of Material

For draperies which are to be lined measure the finished length of both drapery and the lining and allow an

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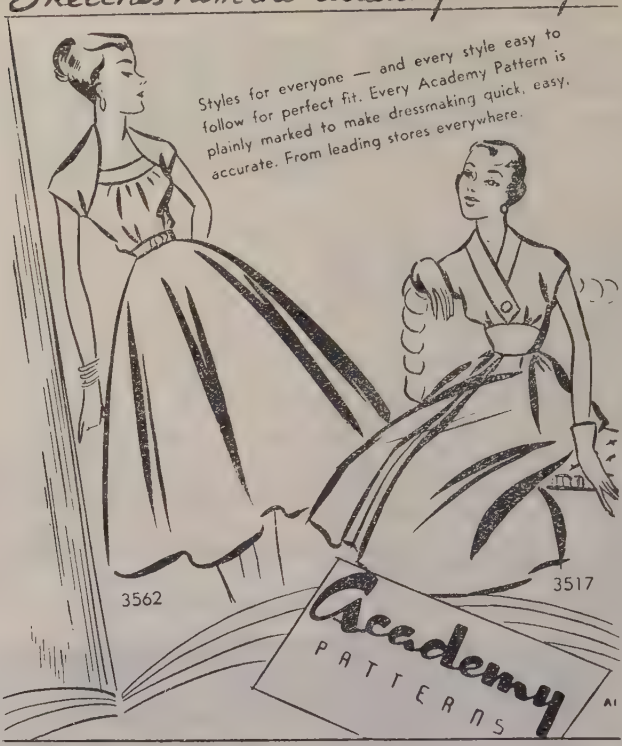

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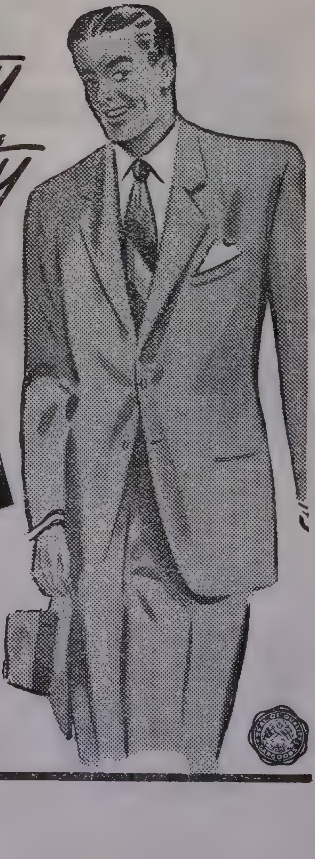

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extra 1½in. for the rod slot and 1½in. for the heading and seam allowance and the usual 2 to 3in. for the hems in both drapery and lining.

In a large-patterned material further allowance must be made for matching the pattern in each pair of curtains.

Measuring the Width

Measure the length of the rod where the curtains will be hung. This will be the width of the window frame, unless it is desired to give a narrow window a wider appearance (see Fig. 6, in which the measurement is AB).

Curtains look best if they measure altogether 1½ or 2 times the width of the rod to give a pleasing fullness. Avoid a skimpy appearance which can result from economising on the amount allowed for the width and fullness.

Cross-over curtains are an exception, as they are of very sheer material, and should be 3 to 4 times the length of the rod to give sufficient fullness.

Draperies require the full width of the material, or 36 to 40in. width for each side of the average window. For very large windows 48in. wide material may be needed.

To avoid a skimpy appearance with draperies that are to be pulled across the window and used instead of blinds 2 to 3 times the width of the rod should be allowed.

Measuring the Length

Figs. 1 and 2 show where to measure for length for each particular style (A to B, C, or D). To this measurement add 3in. for the rod slot, 2in. for the heading, and 2 to 3in. for the hem. If the material is not pre-shrunk, allow an extra inch per yard for possible shrinkage.

Making Curtains

1. Before the material is cut draw a thread and cut on the thread line. If the fabric is not cut on a thread line, the curtains will ripple and pull and it will be difficult to get the hems straight. If the edge cut on the thread line is not straight, the fabric can be pulled on the true diagonal until the cut edge is on the straight.

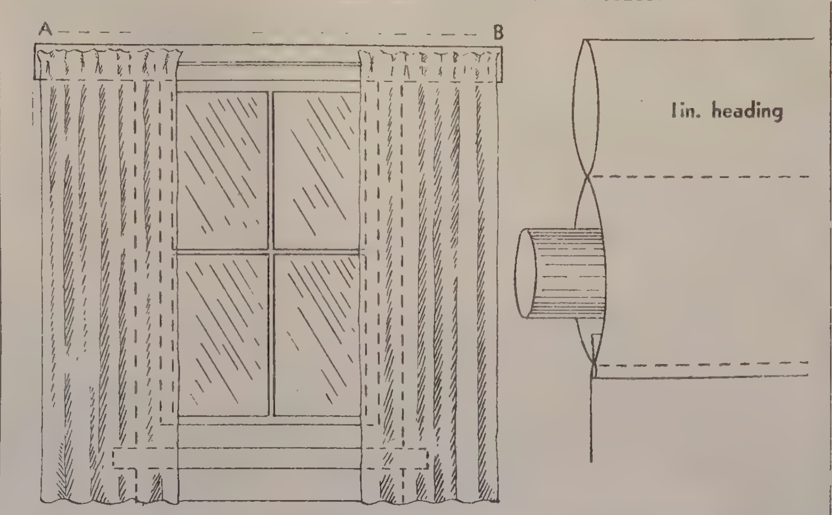


Fig. 6 (left)—The placing of curtains or draperies to make narrow windows appear wider. Fig. 7 (right)—Top hem, showing the heading and the rod slot.

2. Cut the draperies or curtains on a large table or on a clean floor to allow plenty of room to lay the fabric flat.

3. Cut the required lengths for the curtains and cut away all the selvedges. The selvedges are more tightly woven than the rest of the fabric, and often with laundering or cleaning they will tighten up even more.

4. Make the side hems before the lower hems and headings. The side hems may be double or single and 1in. is a good finished width. Use a long machine stitch (10 to 12 stitches per inch) with a loose tension. This will prevent puckering of a delicate fabric and allow for possible shrinkage of the thread when the curtain is laundered.

5. Turn up the hem allowance and stitch in the same way as the side hems.

6. Make a hem on the top of the curtain in the same way as the lower hem. An inch from the top sew another line of stitching to form the rod slot and a 1in. heading (see Fig. 7).

7. After all hems have been pressed rods may be inserted and the curtains hung and arranged in place with attractive folds.

Making Draperies

Unlined draperies are usually made from washable fabrics and the making methods are the same as for curtains. However, draperies hang better if they are lined and it is advisable to have linings where the drapery material is expensive, as lining will protect the draperies from dust and sun fading.

Making Lined Draperies

1. Draw a thread and cut the edge of the material on the straight. Again the fabric can be pulled if the drawn thread edge is not on the straight.

2. Place the fabric so that it lies flat for cutting. Cut one side drapery.

3. Cut the other side drapery (or the number that are required), matching the fabric pattern if necessary so that any patterns in the fabric will be on the same levels when the draperies are hung.

4. Cut away all the selvedges and sew the side hems.

5. Measure for the bottom hem. Fold, press, and sew with mitred corners. Weights to make the drapery hang better may be inserted at this stage.

6. Make the lining narrower and shorter than the drapery so that the lining is invisible from the right side when the drapery is hung. Allow for turnings on the lining, but cut it so that the hemmed lining will meet the side and bottom hems of the drapery as in Fig. 8.

7. Cut away the selvedges and stitch the side and bottom hems.

8. Attach the lining to the drapery at the top by turning drapery and lining right sides together and stitching both together at the top.

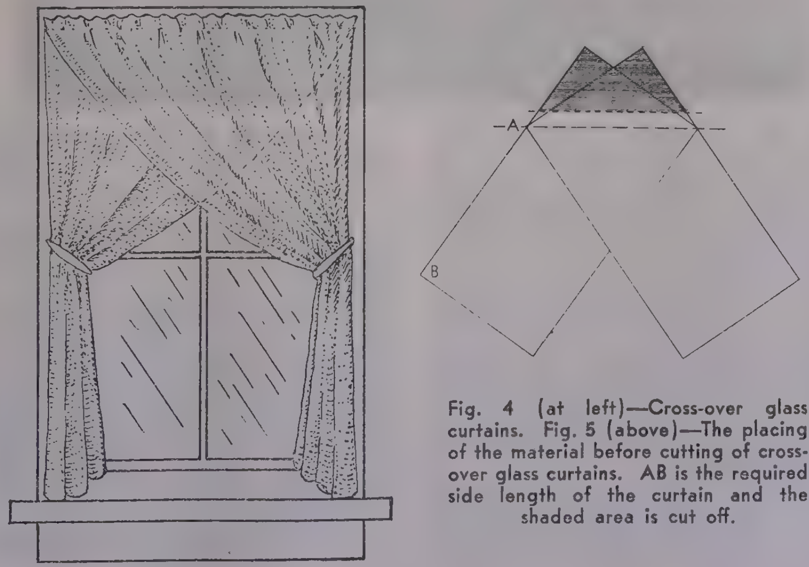


Fig. 4 (at left)—Cross-over glass curtains. Fig. 5 (above)—The placing of the material before cutting of cross-over glass curtains. AB is the required side length of the curtain and the shaded area is cut off.

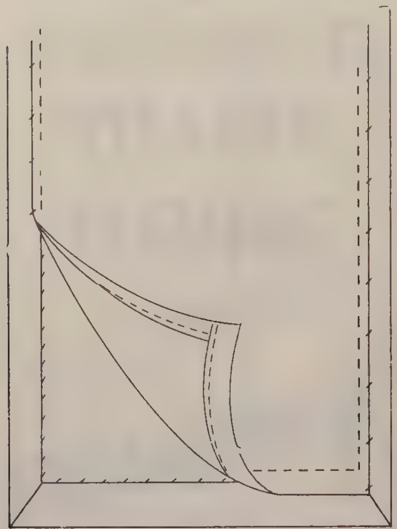


Fig. 8—The fitting of the finished lining on the drapery.

9. Turn the drapery right side out. Stitch through the drapery and the lining 1in. down to form the heading and again 1½in. down to form the rod slot.

10. Attach the sides of the lining to the sides of the drapery with slip stitches or occasional stitches. Allow the bottom hem of the lining to hang loosely.

Pleated Curtains or Draperies

The methods for making pleated curtains or draperies are as described for draperies, except that the rod slot is not made.

1. Decide the amount of material to allow for each pleat (usually 3 to 4in.). Plan the space between the pleats so that they appear at regular intervals.

2. Sew the pleats as in Fig. 9A to the depth of the heading and rod allowance. These will be flat or knife pleats.

Pinch or French pleat: Make the pleats as for knife pleats (Fig. 9A). Fold each pleat in three parts, and crease. Sew the pleats together at the base of the sewn part, using firm over and over stitches (Fig. 9B). Allow the pleat to flare open at the top.

Cartridge pleats: Make smaller pleats than French pleats, either grouped or spaced evenly across the width of the drapery. Stitch each pleat the depth of the heading and rod slot allowance. Then insert wooden dowelling or rolled card to round out the pleat (Fig. 9C). The dowelling or card is removed before draperies are dry cleaned or washed.

To hang curtains and draperies which have pleats, rings or hooks may be attached to the wrong side of the hanging. Rings or hooks may be used with all curtains or draperies in which case the rod slot need not be allowed for in measuring or making.

Valance Frills

Often windows have attractive wooden pelmets which are better left uncovered and require no valance frill for the top of the curtains and draperies.

Though frills at the top of curtains and draperies are not as popular as formerly, there are times when valance frills look most attractive. They may be gathered or pleated, depending on the style of the curtain, the pleated valance being more dignified and formal, though the gathered ones are quicker to make. The valance is hung on an extra rod completely across the curtains and draperies at the top of the window. Extra material must be allowed when the window is measured up for the quantity of material for curtains or draperies.

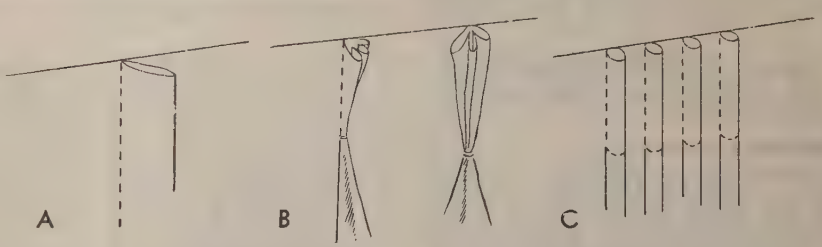
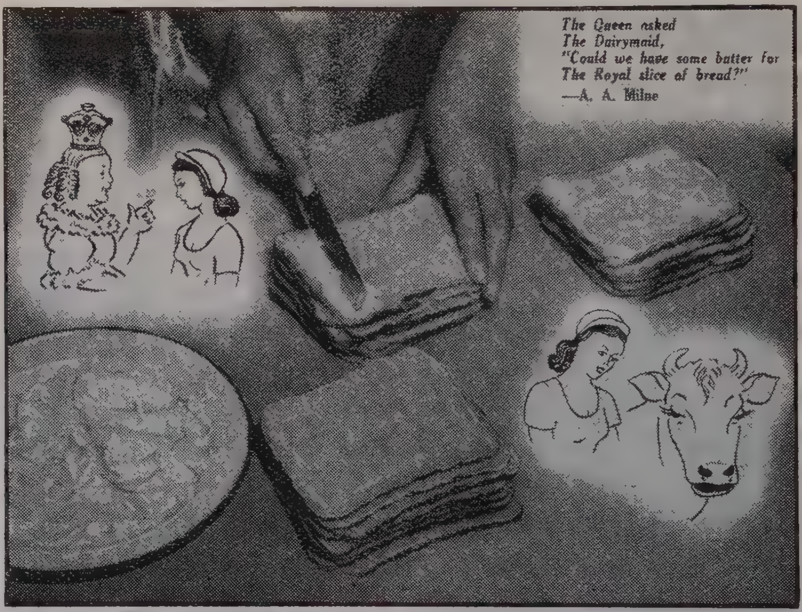


Fig. 9 A—Flat or knife pleat. B—French or pinch pleats. C—Cartridge pleats.

Buttering Bread for Sandwiches



The Queen asked
The Dairymaid,
"Could we have some butter for
The Royal slice of bread?"
—A. A. Milne

IN food preparation there are many little tricks for saving time, and one which few people seem to know is the quickest way to butter bread for sandwiches. Day-old bread is best for spreading, and for efficiency and speed both butter and filling should be the right consistency.

To soften the butter cut it into cubes, stand it in a warm place, and cream it well. Never allow the butter to melt, as this produces an oily rather than a smooth, creamy texture. Use a thick, flat plate for creaming on to save dipping into a bowl when buttering.

Savoury fillings can be softened with salad dressing or with white, anchovy, or tomato sauce.

However, it is in the spreading that many movements are wasted, and for those who must make sandwiches daily a little practice with the following technique will prove well worth while.

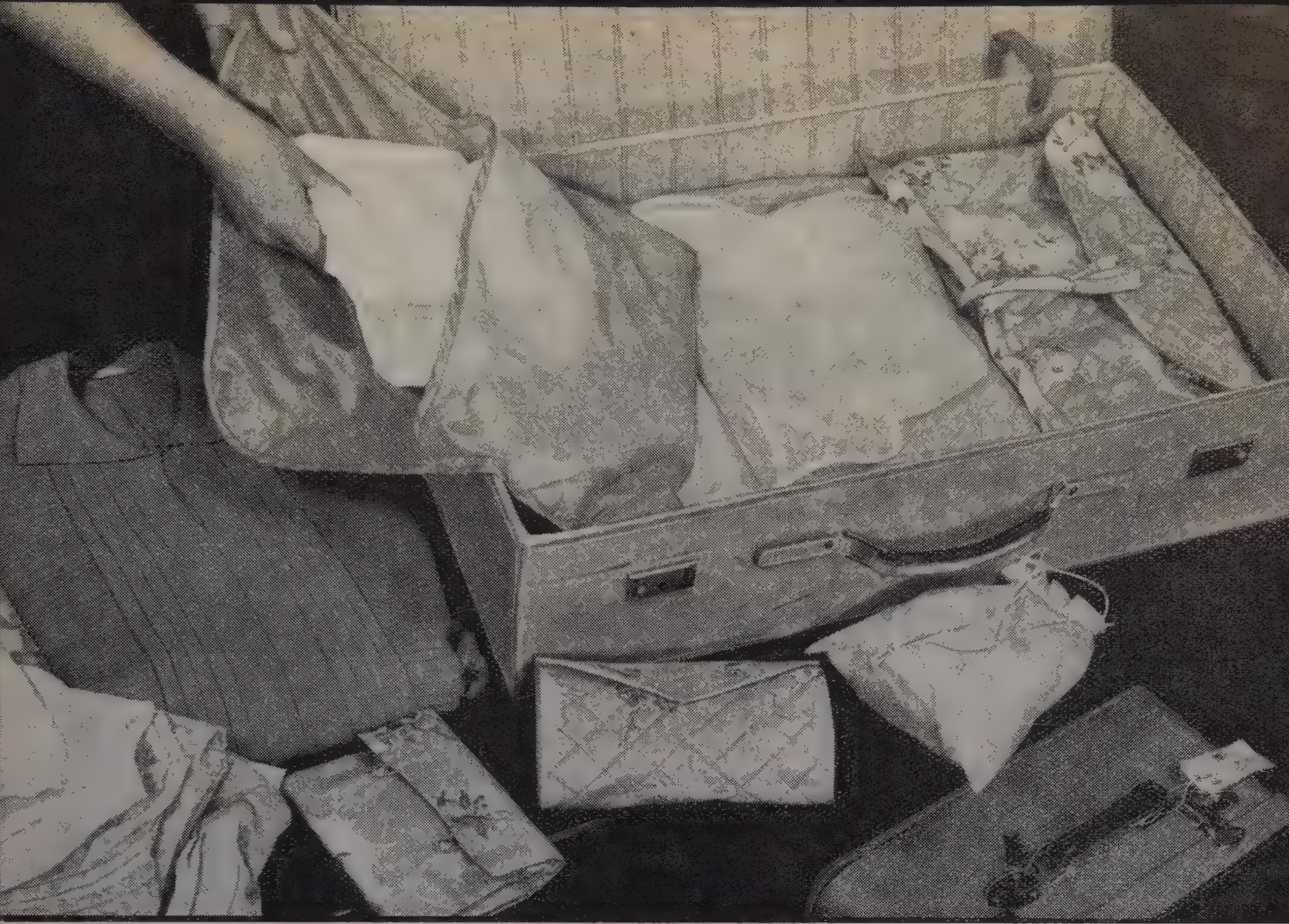
1. Choose a knife with a comfortable handle and a straight, rather blunt edge.

2. Use a good-sized board or bench for working on.

3. Leave bread in piles of about eight to ten slices, and **butter on to the pile.**

4. Take sufficient softened butter on to the knife blade for one slice of bread. With one stroke spread it thickly down the right hand edge of the bread, then with a circular movement, and using the full length of the blade, sweep it over the remainder of the slice. Remove the buttered slice from the pile with the left hand. This saves many small movements and consequently reduces time and labour.

—ELEANOR COUSTON,
Field Officer in Rural Sociology,
Department of Agriculture,
Timaru



Tips for Travellers

THE ambition of every traveller is to "travel light", and the design of modern luggage and materials has made this possible. Experienced travellers reduce their luggage to a fraction of what was considered essential in the past, and carefully evaluate each item to be included. Air travel and labour shortages have had much to do with this transition, and heavy trunks which required several men to lift them have given way to space-saving, light pieces suitable for accommodating minimum clothing requirements. Careful wardrobe planning is necessary, but nylon, plastic, featherweight woollens, and crease-resistant fabrics can be used to great advantage while still providing garments suited to all occasions. Packing can be a wearisome task, reducing the pleasure of anticipation to a degree that one wonders if the trip is worth the effort. With the right things on hand the task is simplified, and in this article Eleanor Couston, Field Officer in Rural Sociology, Department of Agriculture, Timaru, gives some ideas resulting from the question put to several experienced travellers of what equipment and methods they have found most useful.

ONE of the first considerations for a traveller is the weight of the cases and boxes used.

Lightweight Luggage

Lightness in luggage is of primary importance, but durability must also be considered. Cases are available, made from specially treated fibre, which will withstand rough handling, but which are light and weatherproof. For personal handling a soft-topped case is ideal, particularly one which has a tray. The tray can be used for dainty articles such as blouses which would crush if placed among more weighty ones.

Hats should always have their own container, and a lightweight hat box or small attache case should be reserved for their sole use. Perhaps one hat is sufficient, and a beret, headscarf, and roll-up sun hat will pack with other things. Shoes present a problem and the minimum number should be taken. They may be placed in bags or in cut-down stockings and packed in an even layer at the bottom of a case or in a slide-fastened hold-all designed for the purpose.

The heavier type of outdoor clothing is packed next and should be folded to fit the size of the case, each layer being thus kept flat. Tissue paper folded with each garment will reduce the tendency to crease. Underwear and woollens are packed next and then lightweight suits and heavy frocks. Light frocks and blouses are placed on top or in the tray. The case should be full but not overcrowded for best results. A light covering such as a fine huckaback towel will protect the contents and help to hold them in position.

Choice of Clothing

The more crease resistant the fabrics are the less trouble they will be, and this property combined with lightness and climatic suitability is desirable. Synthetic fibres have greatly simplified packing and laundering problems, and availability of some of the newer developments in this field will make it possible to select fabrics with characteristics such as warmth to the touch and absorbency or wool-like qualities. Featherweight woollens and crease-resistant cottons are serviceable and also easy to pack. Cotton seersucker requires little or no ironing, and some prefer it to non-absorbent nylon.

Accessories

A small travelling iron will be useful to the well-groomed traveller, but would be included only for a long journey. Providing the voltage has been checked, the iron may be plugged into an electric light fixture and used to iron small articles such as handkerchiefs or to remove creases.

A coat hanger with pegs takes up no more room than an ordinary coat hanger, but is much more versatile. It can be used for hanging lightweight articles to dry and also for skirts.

HEADING PHOTOGRAPH: Packing a trunk is simplified with the right things on hand. The bags fit the case and lie flat.

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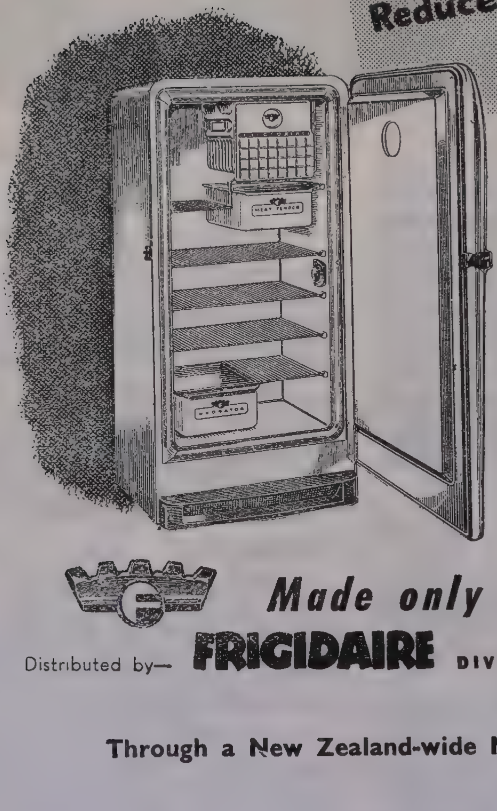

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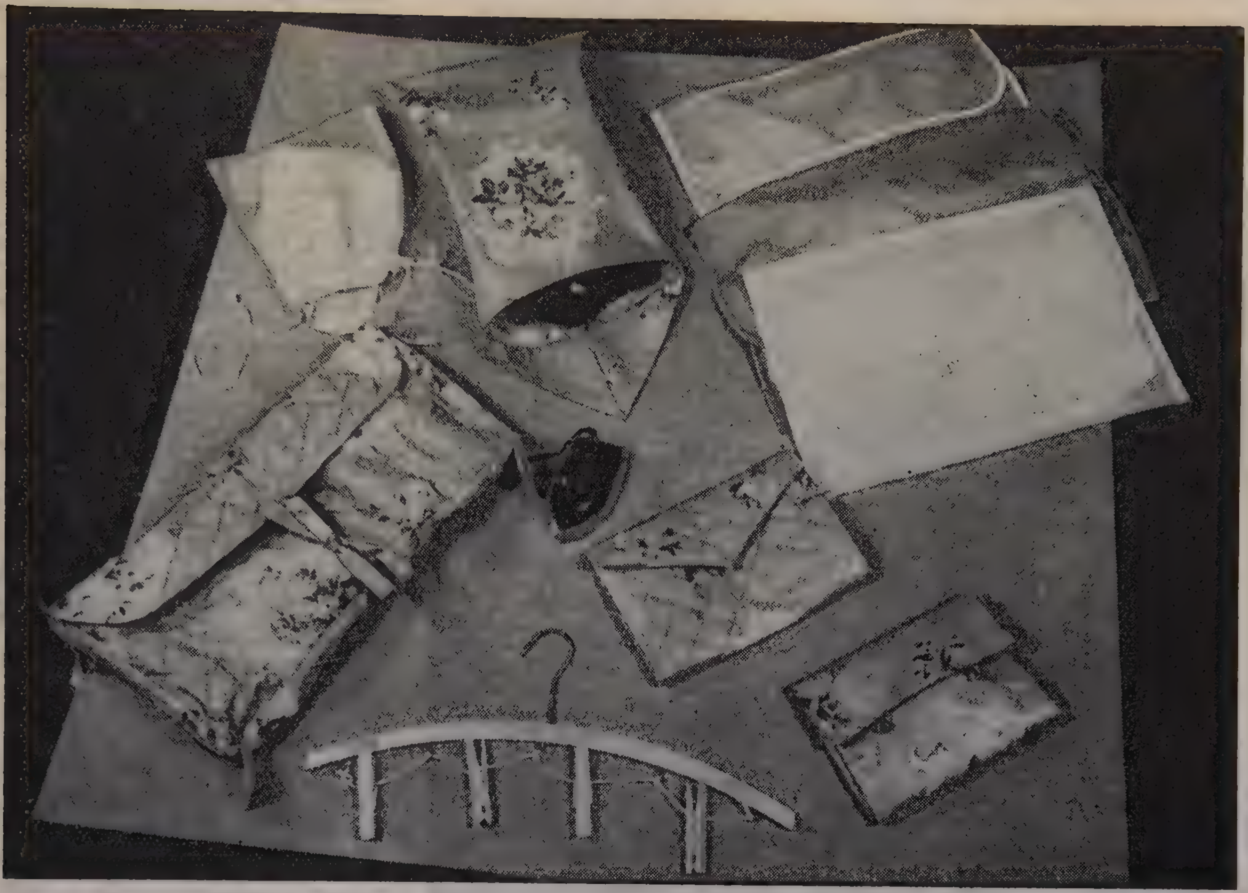
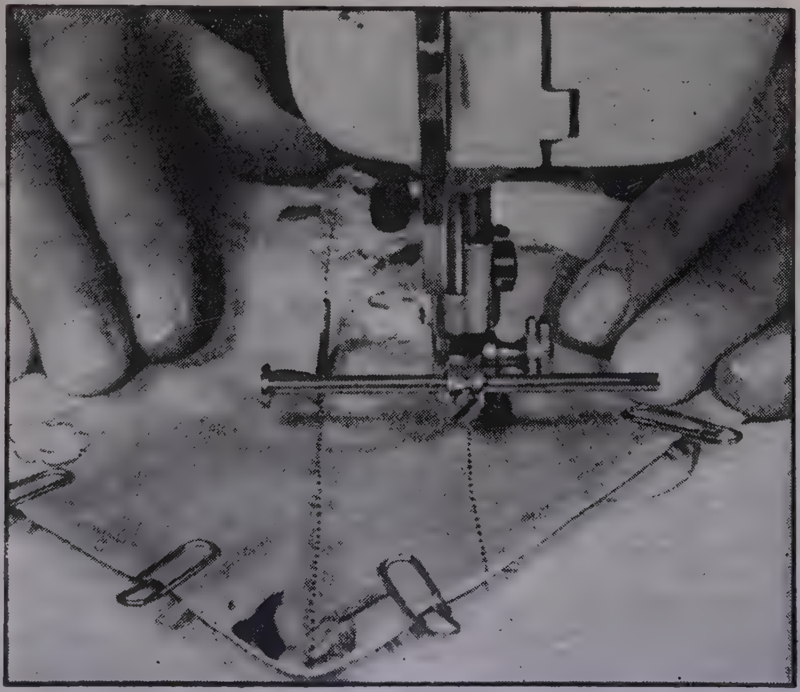


A set of useful and decorative travel accessories. Instructions for making some of these are given in this article.

At right—When plastic or waterproofed cotton is being stitched paper clips instead of pins should be used to hold the edges in position. The illustration shows quilting being done with the quilting attachment.

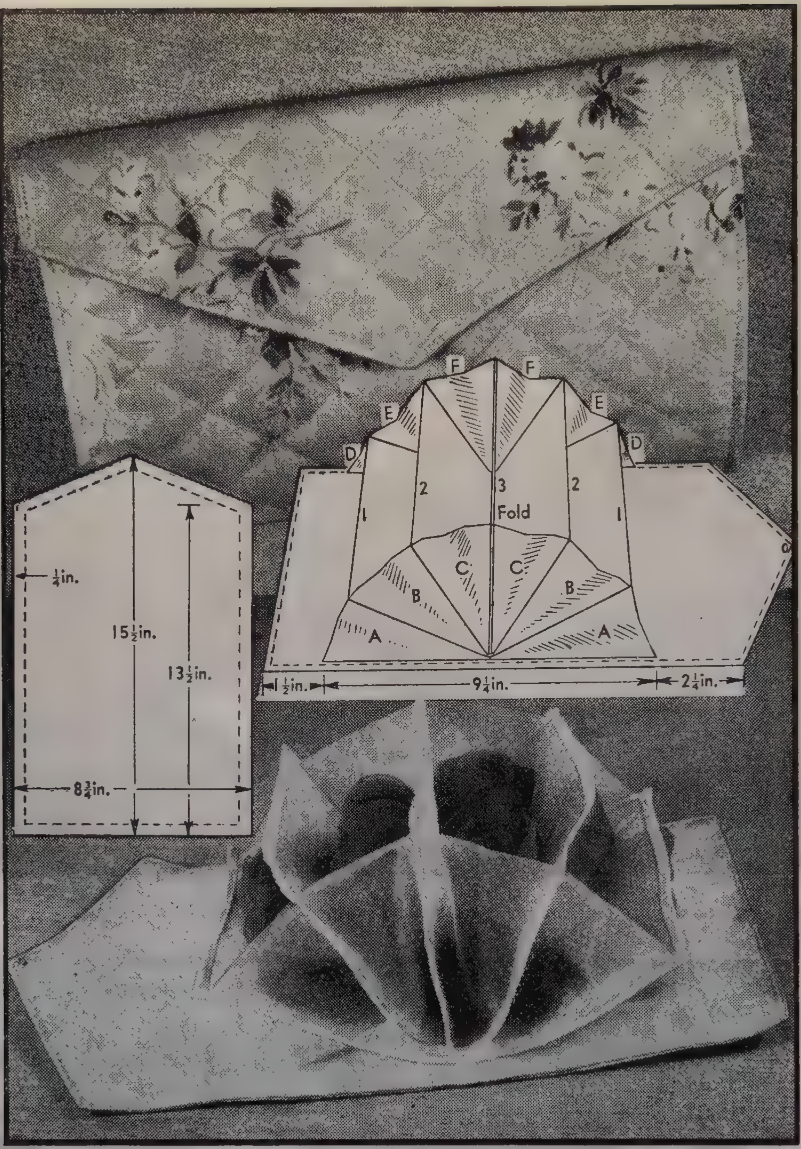


Hair clips are excellent for holding pleats in position for packing, eliminating the need for basting.

Paper handkerchiefs save much laundering and a generous supply should be included.

Shoe bags are simply made and protect the shoes as well as the clothing with which they are packed. A set of these will give the case a trim appearance and look much more attractive than sheets of paper.

Envelope-shaped plastic bags have many uses and can be made to any size to suit individual requirements. They occupy little space and help to prevent creasing. Three at least should be included, one for blouses, one for night attire, and one for soiled linen. As they are waterproof, damp underwear, a bathing suit, or other articles which have not had time to dry can be safely packed in them. These bags should be made to fit the case; for a small case they can occupy a whole layer or for a larger case two or three can lie side by side. They are made by cutting plastic sheeting into



The stocking holder. Upper—The holder closed. Middle left—The pattern. Middle right—Diagram showing method of joining the plastic to the pattern to form the pockets. Lower—The holder open.

envelope shapes and binding the edges with bias binding. Different colours make it easier to select the garment required.

For wet toilet articles such as a face flannel and toothbrush left-over pieces of plastic can be made into a neat little bag. This consists of a rectangular piece of plastic sheeting folded into a bag shape. The upper edge is turned in and stitched to the bag with bias binding. Silk cord is used for the draw strings and is run through the bias binding.

The stocking holder is a traveller's joy. It can be used not only to hold and protect nylon stockings, but handkerchiefs too can be tucked into spare pockets.

The hussif is another compact little container which will hold all the requirements for running repairs. If the traveller wishes, a double thickness of lightweight silk material, divided by stitching throughout its length at ¾in. intervals, can be inserted under the section with pockets. Embroidery cotton can be passed through the divisions, and this will prevent tangling and leave the thread easily accessible. The pockets will hold cottons, domes, mending materials, thimbles, and scissors, and provision is also made for needles, pins, and a stiletto.

Plastic bottles and jars for cosmetics are unbreakable and much lighter than glass bottles.

The cosmetic hold-all which is shown on page 291 has the advantages of lying comparatively flat for packing and of opening at the sides with slide fasteners to display its contents. With this bag it is not necessary to grope for what is required, as it can be placed open on the dressing table, where it will be both practical and attractive.

A matching set of accessories can be made from the directions given below, and each or all would make an acceptable gift for a traveller or a bride.

Choice of Material

Glazed chintz or everglaze is probably the best choice for material. Downproof sateen is an alternative, but it is inclined to be heavy. A small all-over pattern or a stripe would prevent any complications which might arise if a material with a larger motif were chosen.

The plastic for lining the stocking holder should be of heavy quality, and is best plain or spotted if the outer covering is patterned. For the envelopes the choice of a plain or patterned plastic is a matter of personal preference.

The lining of the cosmetic hold-all is waterproofed cotton. It is not advisable to use plastic sheeting, as this material owing to its elastic properties presents difficulties when quilting is being done. Plastic-backed cotton would be suitable, but is not at present available in New Zealand for other than commercial use.

The lining for the hussif could be any firm silk material and faille has been used for the one illustrated.

Materials Required

The amount of materials required for a set including 1 shoe bag, 1 hussif, 1 stocking holder, 1 plastic envelope, 1 toilet bag, and 1 cosmetic hold-all is as follows:—

	Width in.	Length yds.
Glazed chintz ..	30	2
Plastic	36	1
Waterproofed cotton	48	½
Dressmaker's padding ..		½
Flannel	29	¼
Faille	36	½
Butter muslin ..		¾
Silk cord		1½
Elastic	½	¾
Slide fasteners ..	2 x 8	

1 card of bias binding
3 buttons
2 domes
Embroidery thread, silk for stitching

To Make up

The Stocking Holder

For the stocking holder cut or tear a rectangular piece of material 15½in. long and 8¾in. wide. Form a peak 2in. from one end (see the left-hand diagram on this page). Cut a piece of plastic the same size. Cut dressmaker's padding, using one-third thickness, ¼in. less than the above measurements all round. Cut butter muslin to cover the padding. The seam allowance is ¼in.

For the pockets cut 3 rectangles of plastic 9½in. x 6¾in. and 6 rectangles of plastic 9¼in. x 3in.

To quilt the outside covering lay the chintz right side down on a table and carefully place the dressmaker's padding in position ¼in. in from the edges of the chintz. Cover the padding with butter muslin and baste the muslin, padding, and chintz firmly and smoothly together. To do the diagonal pattern quilting turn the chintz right side up and lightly mark in a guiding line at an angle of 45 degrees from the lower edge. Adjust the sewing machine by lengthening the stitch and loosening the tension a little. Use a fine needle and machine down the guiding line. Then, using a quilting attachment, stitch parallel lines 1in. apart. If no quilting attachment is available, mark in further guiding lines. After stitching in one direction, turn the material and work in a transverse direction to complete the pattern. Attach the plastic by placing the quilted fabric and plastic together wrong sides out and stitching round the two long sides and the peaked end. Turn the right side out and turn in the free edges. Fasten into position with paper clips.

The pockets: Making of the pockets is best followed by reference to the right-hand diagram on the opposite page. The narrow side strips (9¼in. x 3in.) will be called A, B, C, D, E, and F. The rectangular pieces (9½in. x 6¾in.) will be called 1, 2, and 3. Stitch strip A, rectangle 1, and strip B together down one long side, with 1 in between A and B. Bias binding may be used for strengthening the edges. Stitch strip B to rectangle 2 and strip C in the same way. Fold rectangle 3 in half. The folded edge is shown in the diagram in the centre of the pockets.

Strip C is folded upward so that half each free side can be joined on either side of the folded rectangle 3. The other sides of the pockets are joined together in the same way, strips D, E, and F being used. The long free edges of strips A and D are then stitched to the plastic side of the quilted covering, starting 1¼in. from the free end. Stitch round the entire length of the hold-all about 3/16in. from the edge. Finish with a dome to hold the peak in position.

The Cosmetic Hold-all

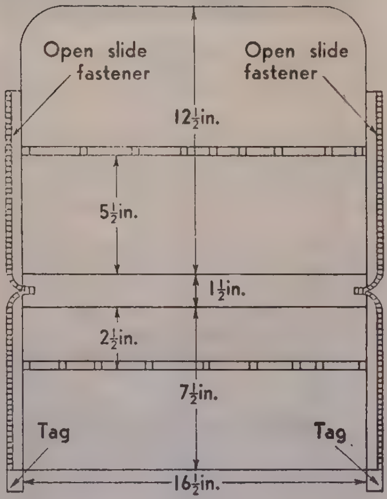
The making of the cosmetic hold-all requires more skill than that for the other articles, chiefly because of the difficulty of quilting waterproof material on a domestic sewing machine.

As pins or basting stitches leave a mark on waterproof material, paper clips should be used for holding it in position for stitching.

Cut or tear a piece of chintz 17in. x 8in. and another piece 17in. x 13in. Round off the corners at one end of the 17in. x 13in. piece. Cut waterproof material to the same measurement. Cut one-third thickness of dressmaker's padding and butter muslin ¼in. less than the above dimensions all round. Cut one long strip of chintz and one of waterproof material 31½in. x 2in.; cut two strips of chintz each 12in. x 2in. for the ties; cut two tags each 3½in. x 1¼in. for the top ends of the slide fasteners; cut two tags each 4in. x 2¼in. for the lower ends of the slide fasteners; cut one length of waterproof material 34in. x 2in. and one length 30in. x 2in. for the strips to hold the bottles and other equipment. The allowance for the turnings is ¼in.

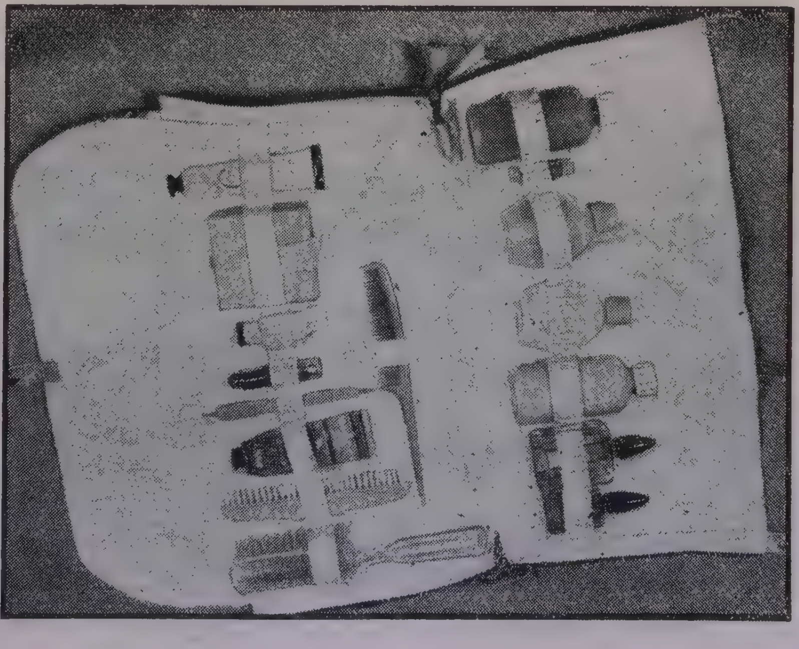
Place the chintz and waterproof material for each section of the bag together on the reverse sides and stitch round three sides, leaving the base end free. Leave inside out and lay the sections chintz side up on a table. Place the dressmaker's padding (one-third thickness) on the chintz.

The cosmetic hold-all. Above—The hold-all lies flat for packing. At right—Diagram of the hold-all. Below—The hold-all open.

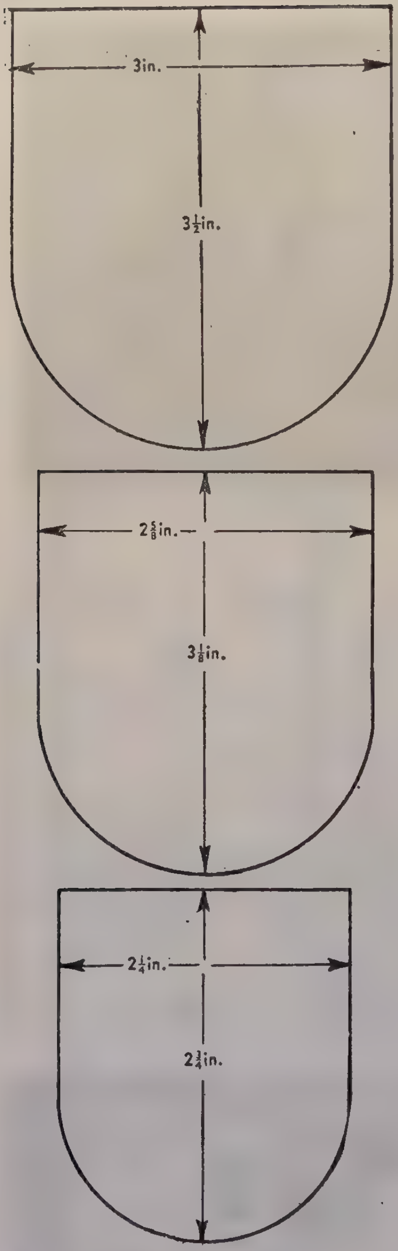


Cover the padding with butter muslin and baste the chintz, padding, and butter muslin into position. Turn right side out. Smooth carefully and neaten the edges. Fasten the edges with paper clips.

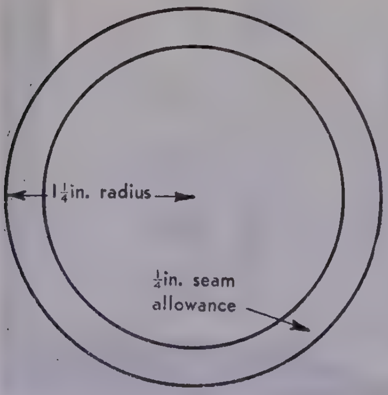
The waterproof material tends to stretch during quilting, so the edges must be carefully watched. Using a medium stitch and a fine needle, quilt the two sections. Insert the slide fasteners through the centre of either end of the long strip of chintz, leaving ¼in. for turnings at either end. Careful measurements are necessary, as each slide fastener should turn the



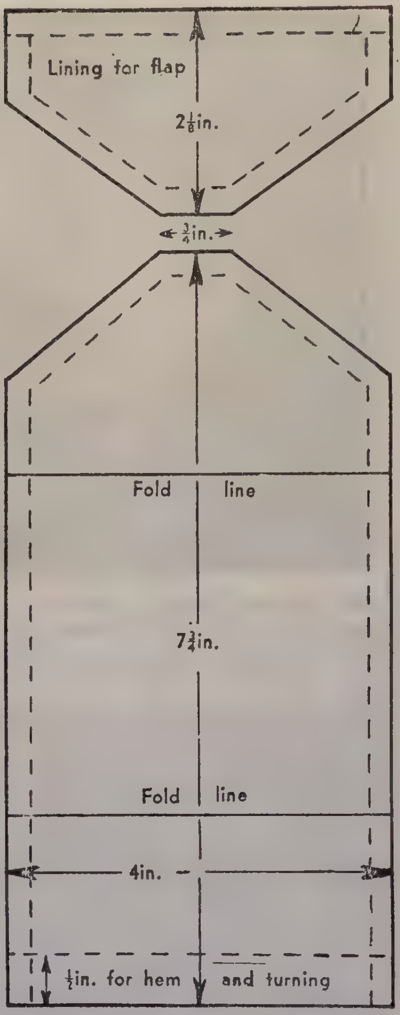
PATTERNS FOR THE HUSSIF


3in.
3½in.
2⅝in.
3⅛in.
2¼in.
2¾in.

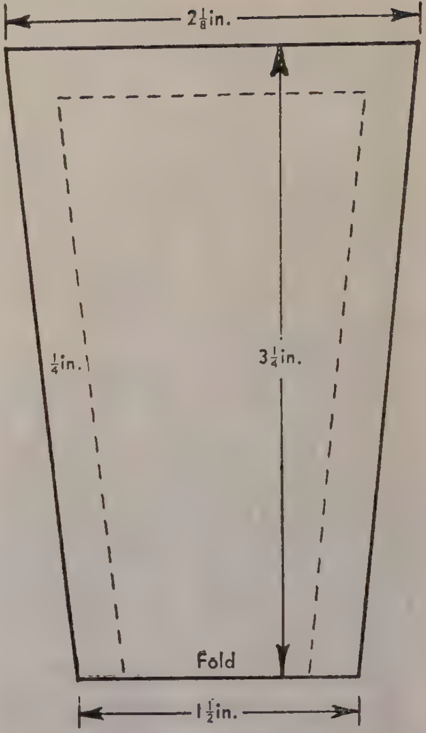
Flannel flaps for needles.


1¼in. radius
¼in. seam allowance

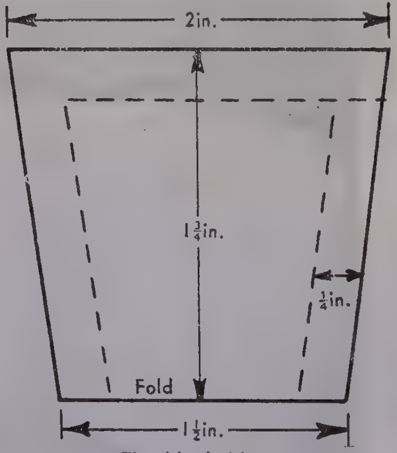
Pincushion (cut two).


Lining for flap
2⅛in.
¾in.
Fold line
7¾in.
Fold line
4in.
½in. for hem and turning

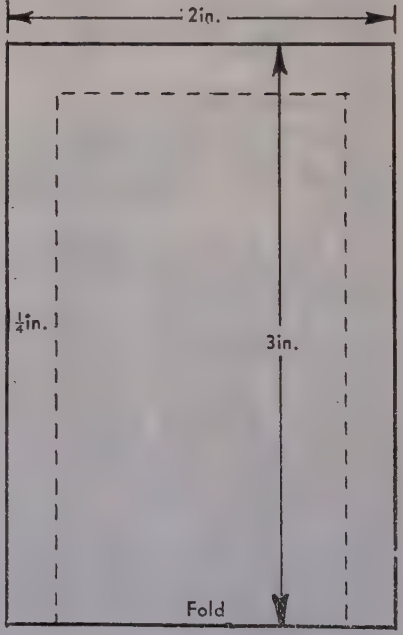
Flap pocket for holding mending materials.


2⅛in.
¼in.
3¼in.
Fold
1½in.

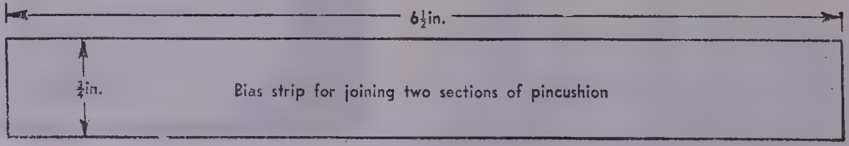
Scissors pocket.


2in.
1¾in.
¼in.
Fold
1½in.

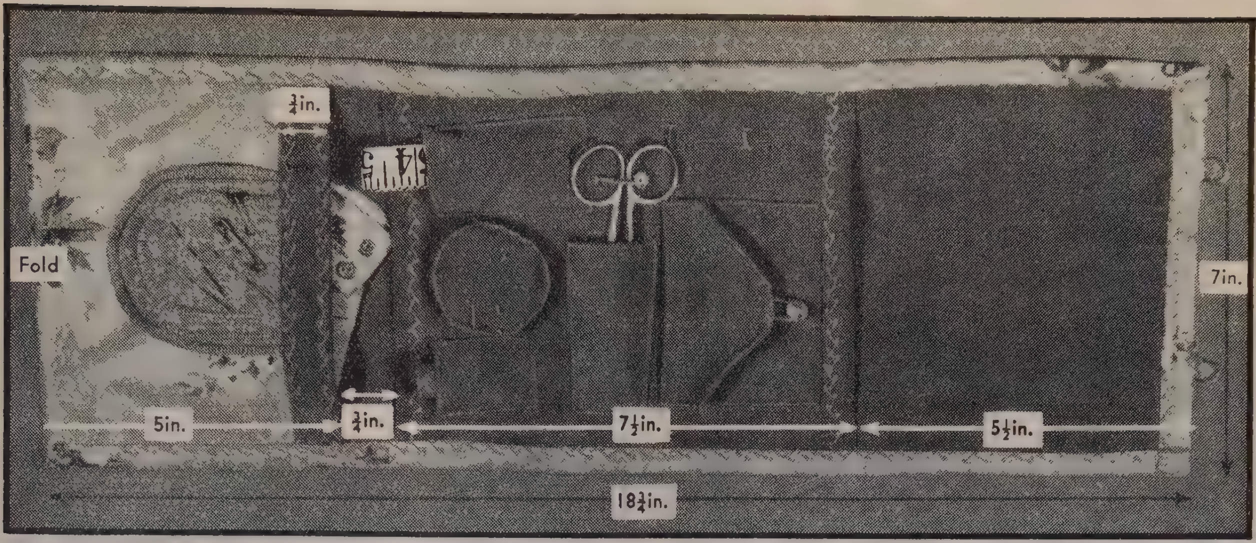
Thimble holder.


2in.
¼in.
3in.
Fold

Tape-measure holder.



Bias strip for joining two sections of pincushion



corner of the completed hold-all so that the hold-all can lie flat when it is open. Attach waterproof strips to the reverse sides of the slide fasteners. With the slide fasteners open stitch the strips first round the waterproof side of one section of the bag and then round the other section. Turn the right side out and stitch round on the chintz side. It may be necessary to hand sew round the corners. Finish off the ends by turning ¼in. in. Make the tags by folding the tag pieces in halves and stitching. Sew on the wide tags directly under the lower ends of the slide fasteners and the narrow tags at the top ends. These enable the hold-all to be opened or closed without straining it.

Make the waterproof strips for holding the bottles and other equipment by folding each piece of material in two lengthwise and turning in ¼in. either side. Stitch both edges. Thread elastic through the longer strip. Measure the bottles, powder box, and other requirements and sew the strips on to the bag at intervals to fit. The bottles are held in position with the elastic and the brushes and other things lie in the straight pieces. The powder box and lipstick holders have small cross strips attached to make them secure. Allow sufficient depth for each article and place one long article, for example, a brush, opposite a short article on the other side of the hold-all. This is necessary for the hold-all to close easily and to lie flat. The strip with the elastic is placed with its upper edge 2½in. from the bottom of the shorter section of the hold-all and the other piece 5½in. from the base of the longer section. Attach small pieces of ribbon to the tags of the slide fasteners to enable these to be drawn up easily.

The Hussif

To make the hussif cut or tear a rectangular piece of chintz 24¾in. x 8½in.; cut the faille lining 24¾in. x 7in.; cut a second piece of faille 9in. x 7in.; and cut the flannel inter-lining 24in. x 7in.

Cut the pockets and pincushion according to the measurements shown in the diagrams on the opposite page. With the exception of the flap pocket these are cut on the fold of the material so that the finished pockets will be of double thickness. Cut the cuff end of an old kid or chamois glove to make an extra lining for the scissors pocket.

To make the lining for the central section of the hussif use a piece of faille 9in. x 7in., and turn in hems at both ends of the 7in. sides, allowing ¾in. for the turn in and the hem. Feather stitch round the upper sides. (For the pincushion and small pockets ¼in. turnings are allowed.)

Make the pincushion by joining the two circles with the strip of bias. Fill with padding and buttonhole stitch the upper edge. Stitch into position.

Fold the tape-measure holder, the scissors pocket, and the thimble holder on the fold line. Turn in the sides and top edges. Buttonhole stitch these into position.

Make the flap pocket by turning in the hem at the lower edge, allowing ½in. for turning plus the hem. Turn in the edges of the main part of the pocket and of the lining for the flap, allowing ¼in. turnings. Baste the lining into position. Hem the lower edge of the lining to the main part of the pocket. Buttonhole stitch the flap and the lining together, then buttonhole stitch the pocket into position.

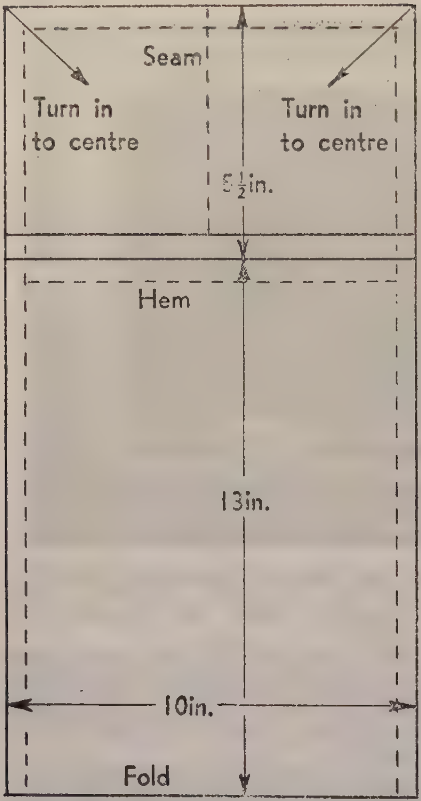
Make the loops for the scissors head and the stiletto. Cut three flannel flaps for needles and blanket stitch round the edges. Place kid interlining inside the scissors pocket and stitch it into position.

Lay the chintz face downward on a table. Next lay the flannel ¾in. from the top end of the chintz but reaching to the lower end. Then lay the lining also ¾in. from the top end. Place the piece with the pockets into position, the top edge 5½in. from the top of the hussif.

Measure the depth of the pocket at the lower end and turn back. Fold the lining over the end so that it will show when the hussif is open. Place the flannel flaps in position and feather stitch along the top and lower edges of the lining.

Turn in the hems along the side of the hussif and feather stitch. Finally, feather stitch the remaining end. Attach loops and buttons.

The hussif closed and ready for packing.



Pattern for the shoe bag.

The Shoe Bag

The dimensions given here will make a shoe bag large enough to hold a large pair of women's shoes. The length may be reduced for smaller sizes. The seam allowance is ½in. Cut or tear out a rectangular piece of material 32in. long and 10in. wide. Make a hem at one end of the material. Fold the material into a bag shape, allowing 13in. from the top of the hem to the bottom of the bag. Join the sides with french seams. Form the peak for the flap by folding the upper corners into the centre on the wrong side and hem the remaining edge. (See the diagram at top of this column.

All photographs by Oddie.

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Quickly Made Nightdress

By MOLLY MACPHERSON, Field Officer in Rural Sociology, Department of Agriculture, Auckland

TO calculate the material required for the quickly made nightdress illustrated measure the length the finished nightdress is to be (top of shoulder to hem, less the length of the shoulder straps) and double this measurement; add 2in. for hems, 5in. for shoulder straps and the strips to hold the top gathers, and 4in. to make the ribbon slot at the waist. The total measurement is the length doubled plus 11in.

OTHER materials required are 2½yds. of 1in. ribbon and thread for sewing. The material may be light cotton or lingerie material.

Method for Cutting

From one end of the material cut 2 strips of material each 2in. wide for the waist ribbon slots (A, Fig. 1).

Cut 1 strip 2in. wide and divide it for strips to hold the top gathers (B, Fig. 1). These two strips are shortened to the required length.

Cut another strip 3in. wide for the two shoulder straps (C, Fig. 1), which are cut to the required length.

The remainder of the material is cut in halves and the armholes cut (D, Fig. 1).

Method of Sewing

Join side seams underarm to hem (EF, Fig. 1). Turn down 1in. top hem allowance and sew. Gather top hems back and front to fit, and sew the strips to hold the gathers on to the top of the back and front of the nightdress, leaving a gathered frill above (see Fig. 2).

Join the two pieces for the waist ribbon slot together. Turn the nightdress inside out and at the waistline sew the long strip, with the raw edges turned in, so that a slot is formed for threading ribbon. Turn the nightdress right side out.

Turn in and hem the raw edges at the armholes and hem the sides of the shoulder straps and attach them to the nightdress. Turn up bottom hem.

Cut a slit in the middle front waist of the ribbon slot and buttonhole around the raw edge.

Thread the waist slot with 2yds. of the ribbon. Make a bow with the remainder of the ribbon and sew it to the top front of the nightdress.

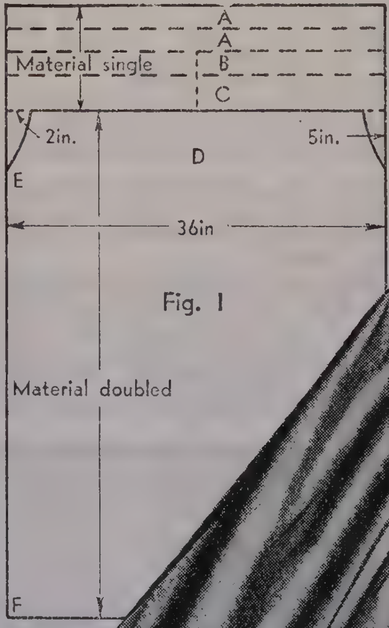
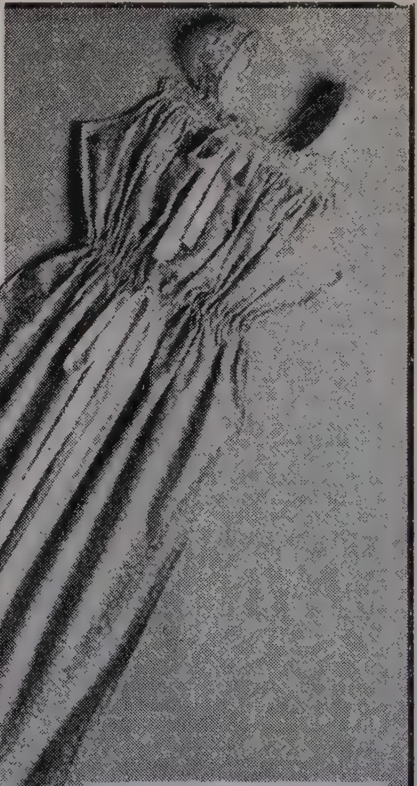


Fig. 1



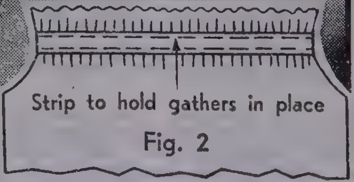


Fig. 2

[Sparrow

Reducing Diets Should be Properly Planned

By EVELYN E. MOORE, Field Officer in Rural Sociology, Department of Agriculture, Palmerston North

SINCE it has become fashionable as well as beneficial to health to be slim a great many women have at some time or another put themselves on a reducing routine, with varying success. Because of this fashion ideas for weight reducing have become a commercial proposition, and many people go to unnecessary expense and possibly adversely affect their health by following one or more of the advertised aids to reducing.

MANY of the so-called aids are of little value; others, which necessitate the consumption of glandular extracts such as thyroxin or the use of appetite-reducing drugs may have a harmful effect on health if their consumption is not carefully controlled.

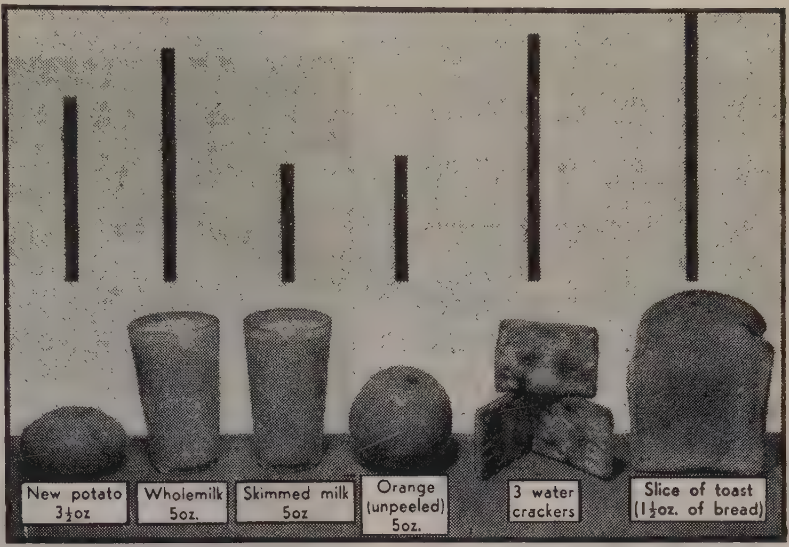
Massage is often recommended as a means of reducing, but though it may result in a redistribution of fat, massage alone cannot remove it. It may occasionally seem to do this by toning up flabby muscles, but it is certainly not an easy way out for the decidedly overweight person. Exercises designed to improve the posture or general figure, though they may be of great benefit taken in conjunction with a reducing diet, are alone rarely of benefit in weight reduction.

Exercise Only Increases Appetite

Physical exercise as a means of reducing weight is also advocated, but it seldom causes more than a transitory weight loss through loss of water from perspiration. In the average healthy person outdoor exercise increases the appetite and makes any restriction of food consumption more difficult, and the middle-aged adult who has an occasional burst of enthusiasm for strenuous exercise is apt to do himself more harm than good, especially if his normal work is sedentary.

The outdoor manual worker or person in hard physical training invariably has a healthy appetite and such people frequently put on weight when they retire to more sedentary pursuits, as their appetite may not decrease in proportion, showing it can be an unreliable guide to food requirements.

It is also sometimes stated that reducing fluid and salt consumption to a minimum are ways of losing weight. Neither water nor salt alone, however, has any energy or fattening value and restricting their consumption is unlikely to have any effect on weight loss over a long period. For a short time restriction in fluid or salt intake might produce a weight loss, through a loss of water from the body of 2 or 3lb. or even more, but it quickly stabilises at the lower level without any real loss of fat. Such water, of course, is very quickly and easily regained.



The comparative energy values (potential fattening values) of some common foods.

Misconceptions about Fattening Foods

There are also a great many misconceptions about so-called fattening foods and reducing foods and reducing diets. In the first place the only way to judge the energy or potential fattening value of a food is by means of its calorie* or energy content. Naturally fats and foods containing a high proportion of fat are highest in this respect, but all so-called slimming foods such as orange juice, apples, and raw vegetables still have energy value; some, like fairy toast and dry water crackers, have a comparatively high calorie content for their weight.

In the planning of a reducing diet the nutritive value of a food—that is, its protein†, vitamin, and mineral content—also requires consideration, for the person on a reducing diet does not have a reduced requirement for these nutrients. Thus foods with a high nutritive value in proportion to their calorie content such as fruits and vegetables—including a moderate serving of potato, for it is a valuable food—skimmed milk, lean meat, and eggs should be the mainstay of this type of diet. Cereals such as bread and porridge should be restricted in quantity and all foods with a high energy value in proportion to their vitamin and mineral content such as sugar and all sweets, cakes, biscuits, pastries, steamed puddings, sauces, pickles, jams, cereal dishes like spaghetti, gravy, salad dressings, and fried foods should be rigidly excluded.

Omitting meals or having fasting days or semi-fasting days when orange juice or water crackers are allowed are not advisable as a means of losing weight, as the temptation to eat between meals or eat more at succeeding meals remains, and a period of fasting, especially in the person carrying on normal work, is apt to result in a feeling of lassitude, faintness, reduced efficiency in work, and possibly reduced resistance to infection. Instead the consumption of three balanced meals each day, with raw fruit (2 to 3 servings daily) and eggs, salads (no salad dressing), lean meat, and vegetables, skimmed milk (1 pint each day) alone or in tea, coffee or desserts like junket, butter (1oz.), and wholemeal bread (3 or 4 slices each day) forming the basis of the dietary, should result in gradual weight loss without any of the unpleasant symptoms associated with sudden and drastic weight reduction. Wholemeal bread is just as fattening as white bread, but it has a higher vitamin and mineral content and is therefore of especial value in a reducing diet when the total food consumption is less than normal.

Cause of Overweight

There are many fallacies about the best way to diet, but there is also the often-heard fallacy that overweight is an imposition of Nature—for example, it may be ascribed vaguely to glands—and it is therefore regarded as a waste of time or as harmful to health to try to reduce the weight to within normal limits.

Some people may tend to put on weight more easily than others, but overweight is caused basically by eating more food each day than is used to provide energy for work and other bodily functions. Thus it is possible for overweight persons to lose weight and to maintain the body weight at a lower level if they persevere and adhere strictly to a well-planned reducing diet. In this respect it is advisable for the person who is considerably overweight and who would therefore be on a reducing diet over a fairly long period to reduce weight under the supervision of a doctor, who will be able to ensure that good health is maintained.

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* A calorie is a unit measuring the energy or potential fattening value of food; in the same way an ounce is a unit measuring its weight.

† Protein is a nutrient which constitutes a large part of the muscle and various organs and which, like vitamins and minerals, must be present in adequate amounts in the food eaten if health is to be maintained.

Finally the stout person should realise that once she has reached the desired weight she may perhaps increase her food consumption slightly, but a return to the pre-reducing menu will inevitably result in a gain in weight and the effort will be wasted. Consequently, though the appetite does in time adapt itself to a reduced food intake which may even be considerably less than that of the rest of the family who are of normal weight, the person with an inclination toward stoutness should realise that some restraint in food consumption may be necessary for some time if she wishes to maintain her weight at a reasonable level.

Whipping Egg White for Different Uses

EGG white is used often in cookery in the preparation of puffy omelets, cake frostings, meringues, souffles, and coatings, and sometimes for clarifying soups and coffee, but the consistency of the beaten egg white varies for each of its uses. The following are a few simple rules which should help to ensure success:—

1. Have the eggs at room temperature.
2. Separate the eggs very carefully so that there is no trace of yolk in the white.
3. Have the bowl and beater perfectly clean.
4. Use a deep bowl for a revolving beater, and a shallow bowl or plate for a wire whisk.
5. Beat or whisk to the correct stage. For example: (a) Foamy for clarifying or coating. The air bubbles are of moderate size and the egg is still liquid, although rather thick. (b) Stiffly foamy for souffles, soft meringues, and sponge cakes. When the beater is lifted from the bowl the whipped egg white just retains its shape and the "peaks" bend well over at the tips. (c) Stiff for puffy omelets, hard meringues, and cake frostings. When the beater is lifted from the bowl the whipped egg white easily holds its shape, but the peaks bend over slightly at the tips. Its appearance is glossy. (d) Dry for shirred eggs. Here the egg white appears dull and is very stiff. Over-beaten egg white appears dull and has small, semi-solid flakes separating out from the foam.
6. Do not leave the beaten egg white to stand before combining it with other ingredients, but use it at once.
7. If yolks and whites that are to be combined immediately are being whipped, use the beater first for the whites and then for the yolks.

—*BETTY JOHNSTON,*
Field Officer in Rural Sociology,
Department of Agriculture,
Wellington

Filet Crochet Corners

THE appearance of table cloths, tray cloths, and other linen or cotton furniture coverings can be considerably enhanced by the addition of filet crochet corners to the material used. The sample illustrated can be made by following the instructions given here.

MATERIALS required are No. 8 crochet cotton and a No. 3 steel crochet hook.

Abbreviations: Ch., chain; tr., treble; s.c., single crochet.

Working of Filet Crochet

A Block

A block is shown on the chart by a cross and consists of 3 trebles. When 1 block stands alone there will be 4 trebles in the group, the first of which belongs to the previous space. When 2 blocks stand alone there will be 7 trebles in the group, 3 for each of the 2 blocks and 1 for the previous space. Therefore all groups of blocks will have 3 times as many trebles as there are crosses, plus 1 for the space. When working a block into a space work 2 of the 3 trebles into the hole and the 3rd into the following treble.

A Space

A space is shown on the chart by an open square and is worked as follows: 2 chain, miss 2 chain (or 2 trebles), 1 treble into next stitch.

Decreasing

To decrease **for the right-hand end of the work**, slip stitch to the desired position and continue working in the ordinary way.

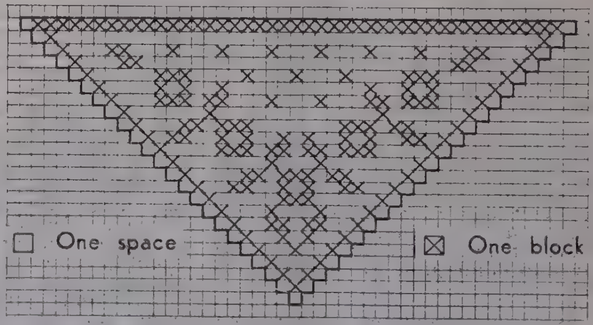
To decrease for the **left-hand end of the work**, turn, leaving the desired number of spaces or blocks unworked, and continue working as shown on the chart.

The Pattern

Make 140 chain (5 of these to be used for "turning" to represent 1 tr., 2 ch.).

1st row: 1 tr. into 8th ch. from hook, then 1 tr. on each ch. to the last 3 ch., 2 ch., 1 tr. in last ch.

Continue working from the chart, each cross representing a block of 3 tr. and each plain square a space of 2 ch., 1 tr.



The Edging

Buttonhole stitch the corners to the cloth. Roll or buttonhole stitch the edges of the linen, then work the following crochet edging all round, working in the spaces on the corners and over the hemmed edge of the linen, spacing the edging to match. * 1 s.c. between 2 spaces, 7 ch., 1 s.c. between next 2 spaces, turn and work 4 tr. into 4 ch., 2 ch., 1 s.c. back into 4th tr. Now work 1 s.c. into each tr. Repeat from *.

What Show Judges Look For

By EMILY E. CARPENTER, Senior Tutor, Department of Adult Education, Home Science Extension, University of Otago

WHAT is it that makes a show judge award the coveted red ticket to this entry, while that one is passed over? How does she choose among several good entries? It is important to know what show judges look for, if competitors are to measure up to judges' standards and to improve their exhibits.

SHOW judges from all over New Zealand have provided material for this article by answering a questionnaire. In each section they were asked to state what they looked for, how they marked, and common faults and to give suggestions for improvements. Their replies are summarised below:—

Will the judge disqualify? Jars with outer screw bands left on must have these removed so that the inner seal can be tested. The steward (left) awaits the judge's verdict.

Preserves Section

Jam: Judges consider a good jam to be one of a good, bright colour true to that usual for the fruit. When jam is tipped out into a spoon or a dish it must sparkle as it catches the light. Jam is made to be spread, so it should not have large lumps of fruit floating in a thin syrup nor should it be cooked to a mush. It is made to be eaten, so competitors should expect their jam to be tasted. Judges look for a flavour as near as possible to that of the fresh fruit.

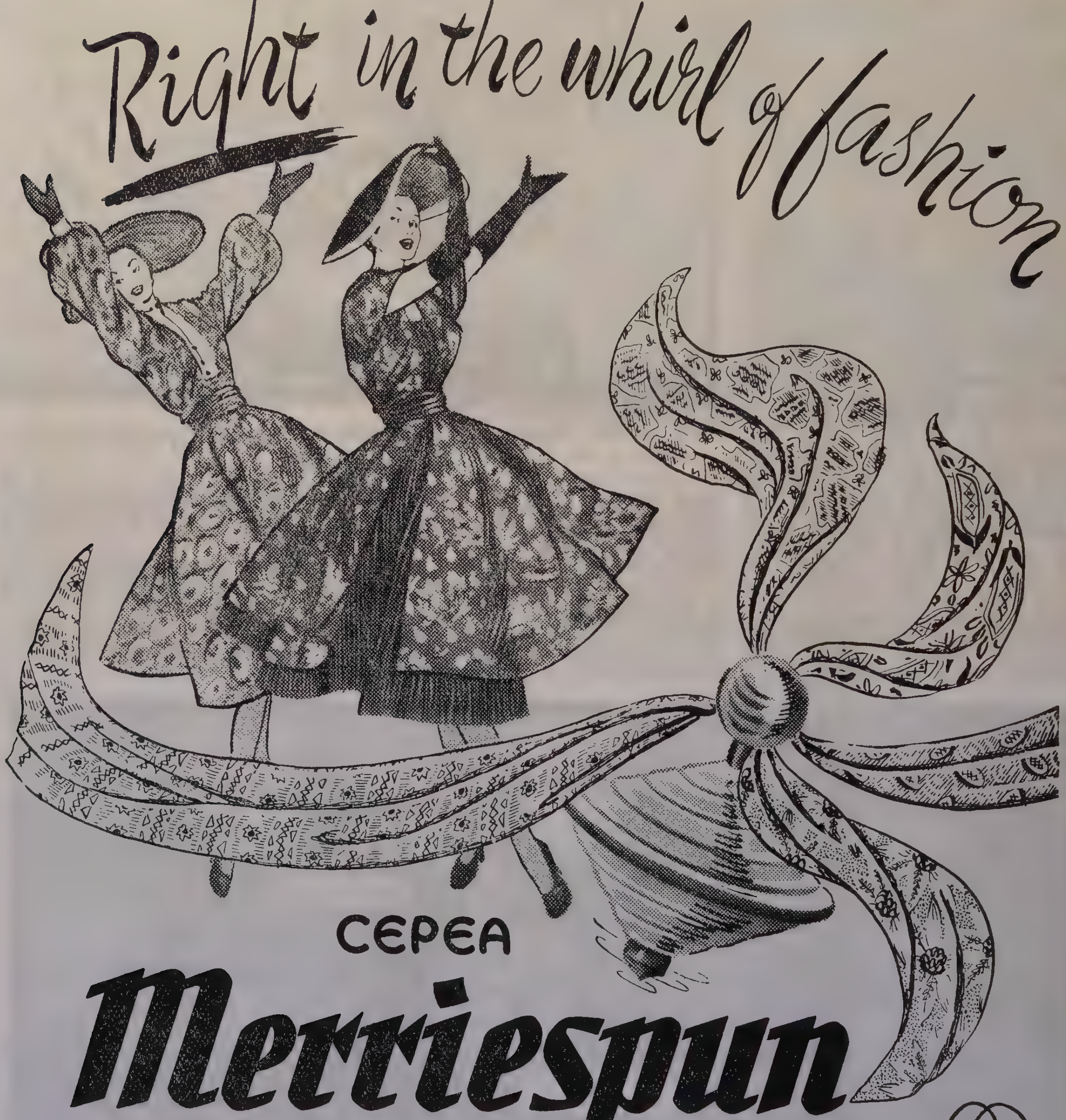
Marks are lost if jam has been overboiled, making it dark, gluey, and lacking in flavour, perhaps even scorched. This is the most frequently listed fault in jams. Any mould or sugar on top detracts from the appearance of the exhibit, as does shrinkage, which occurs when the jam has been kept in too warm a place.

Jelly must be sparkling bright and so clear that print can be read through the jar. Jelly, too, must be tasted. It should cut with the spoon, leaving sharp angles, but not be so stiff that it will not quiver as it is moved; nor should it be so soft that it collapses and weeps into the dish. Again, a fresh fruit flavour is the desired quality.

Entries in the jelly section are often very poor—dark, clouded, stodgy, and often of a very indefinite flavour. A

BELOW: Which would the reader choose? Appearance counts, but taste, feel, and smell must be scored too.

Class No.
Class No.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When all look so good how can one decide which should receive the awards? The competitors who make that little extra effort will win.

dark jelly, which indicates overcooking, is less to be praised than a light one, as it is much more difficult to attain setting point while colour and flavour are still fresh. Artificial colourings should never be added; nor should gelatine be added to make jelly set. These are artifices unworthy of a good cook.

Pickles and relishes are difficult to judge because of variety in type and seasoning. A good pickle or relish should be true to type and of correct flavour and colour for that product. Texture is hard to define, as what is desirable varies considerably, but the fruit or vegetable must always be properly cooked and the consistency neither too thick nor too thin. Tomato sauce is often too watery. It should not separate out as one so frequently sees.

Bottling: What points do judges look for? First, they test the seal. Any jar which is not airtight must be disqualified, as obviously the food in it cannot be preserved. This means that the outer screw band must be removed from vacuum seal lids so they can be tested. Housewives should always do this before they put food away on their shelves, yet many jars of bottled fruits and vegetables come to shows with this outer screw band on. If these cannot be removed by the steward, the entry cannot be judged.

Jars cannot be opened for testing the contents when they must stand on show for some days, so judges place great emphasis on examining the outward appearance. A neat pack of well-graded fruit is most important. There should be no blemishes or stalks left on, as these mar the appearance. The fruit or vegetable itself must be a good colour and look cooked.

The syrup in which fruit is packed should be clear with no sediment. Fruit packed in water always looks well, but it has not the flavour and texture of syrup-packed fruit, so the latter gains more credits than the former. Fruit has been packed in petrol, so when fruit looks suspiciously clear and bright, judges are within their rights in insisting that jars should be opened.

Hints for Jams and Jellies

HOW can jams and jellies be made better? Judges suggest they be made in small lots (4 to 6lb.) for quick cooking and good colour and flavour. Make jams and jellies fairly early in the season before the fruit gets too mature. Light-coloured fruits are always more attractive than dark ones. Strain the juice for jelly, or, better, bottle the strained juice and sterilise it. Leave it for 3 or 4 weeks before making it up into jelly; it will be found that much more sediment separates out and the jelly will therefore be clearer.

Faults that judges notice most often are poor preparation of fruit and poor packing. Only the very best of fruit in prime condition is fit for preserving. It should be peeled or blanched most carefully so that no bits of skin are left to fall to the bottom and cause sediment. Over-cooking too, causes sediment as well as spoiling the appearance of the fruit.

For success with bottled fruit, as with all entries, the exhibitor must be prepared to take pains, though perhaps one enthusiast went too far when she shaved her gooseberries! Select the very best fruit from that available and pack each piece in the jar with an eye to the most colourful and attractive effect—all the blushing cheeks turned outward with apricots, all the stem ends hidden with tomatoes, rhubarb all cut to the same length, and so on. Do jars for showing separately, or reserve the best jars from each batch for possible showing. Do not keep prizewinners from year to year; they do not wear well.

Staging an exhibit: Appearance counts with preserves. Judges like to see clear glass jars for jam or glasses for jelly and containers all of the same size. Pickles and relishes look best in uniform, wide-mouthed jars. Fill all containers in an entry to the

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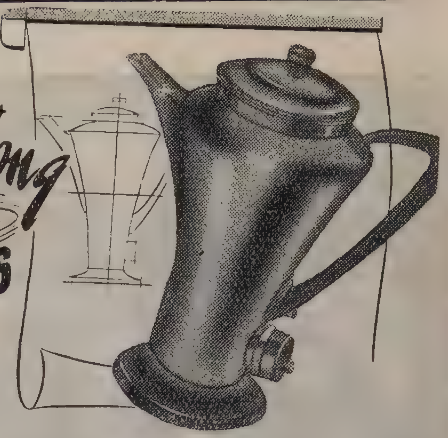

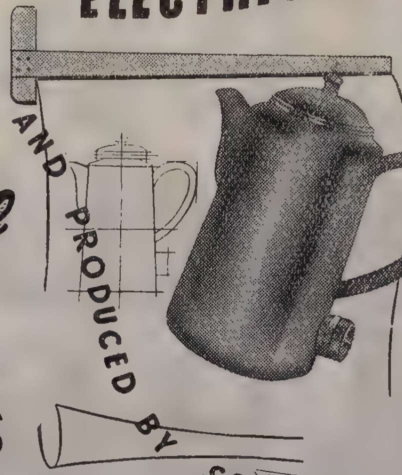
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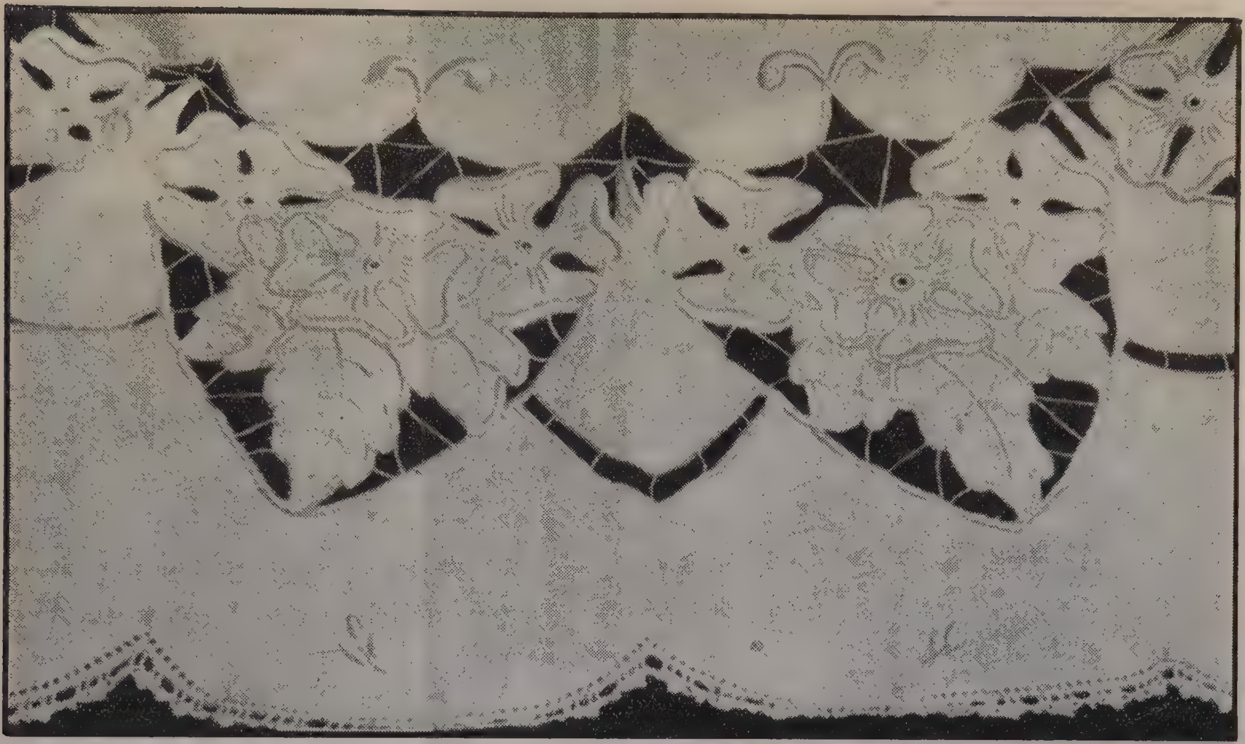


Technique is not everything. This stitchery is well done, but the small sprays near the edge are superfluous and the edging is inappropriate to the main design. Padded scallops would have been more suitable.

same height and cover and label them neatly.

Dusty or rusty tops and finger-marked jars prejudice the judge against an entry. Put on new tops if necessary. Take a soft cloth to the show to wipe and polish jars as they are set out on the show bench.

Baking Section

Scones: A good scone should be light and well risen with straight, even sides and a smooth top. The top and bottom should be an even, golden brown, and when a scone is broken open the crumb should be soft, white, and spongy.

Competition scones have many faults. Often they are poorly shaped, indicating that the mixture has been too soft, and have flopped everywhere. Sometimes the scone has been made very thick, in an attempt to make it look well risen, and so is thick and stodgy. Too often scones have a thick coating of flour on the bottom, which is not at all necessary and is most unattractive.

Some scones when broken open are tough and leathery and the crumb is full of holes and tunnels. A very open texture indicates too much baking powder, and tunnels and toughness are due to over handling, a very common fault.

Scones are made for eating, so when they are smelt or tasted they should be fresh, sweet, and nutty. Specks of soda or a smell of soda and a yellow tinge are most unpleasant to eater and judge alike.

There is some confusion about scone entries. In general, a plain scone contains no butter or fat and should be oblong or square. Round scones are considered to be fancy in most schedules.

Pikelets: Appearance is important. All pikelets in an entry look well if they are the same size and shape. It does not matter whether they are oval or round as long as they are all the same and not too large or too small. The under sides should be smooth and evenly browned, while the tops should have the characteristic rings round the edges.

When pressed with the finger pikelets should feel light and spongy. The judge breaks it open. Is it soft and tender? It is more likely to be tough and gluey, because many pikelets are overmixed. The inside crumb must be creamy with a fine, even texture. Tunnels and large holes are faults as are dark lines indicating that pikelets have not been properly cooked.

Common faults are much like those among scones—overmixing, too much raising agent, poor cooking. Girdles are often too hot, making the under surface rough and blotchy instead of smooth and even.

Baking powder breads: These are tricky to judge, as often the schedules are too vague and one finds date loaves and nut loaves in the same class. Such different products need separate classes. Then, unless a special weight or size of tin has been specified, large billy loaves are entered with those baked in baking powder tins. Judging these together is very difficult.

Quick breads, made with baking powder, are similar to scones. The outside should be smooth, well risen, and evenly browned top and bottom. When a loaf is cut the judge notes if it handles well and if the distribution of fruit or nuts is even. Then she examines the crumb. A smooth, even texture, soft and spongy, with no tunnels or open pores will gain high marks.

Taste and smell are most important, because judges never forget they are judging food. The loaf should have the characteristic taste and odour of its particular type.

Again, overmixing is a common fault. Once the dry ingredients are in there should be no beating; one quick mixing until they are barely dampened. The mixture will look lumpy, but getting it smooth achieves nothing more than toughness and tunnels. Excess of baking powder gives a dry, wiry texture, and too much soda makes it yellow with an unpleasant odour and flavour. Firing is important, as under-cooking causes doughiness, perhaps even a sticky dark line just under the top crust.

Shortbread: This is another class that needs some clarification. Should the mixture be baked in one large round or in biscuit sizes? Should the top be fork marked, and if so, how much? These are points to be decided by the show committee and printed in the schedules as a guide to judges and exhibitors.

Judges agree about what constitutes good shortbread. A pale, smooth outer

Good judges, unlike good soldiers, look behind. The back of the work (left) should be neat with the ends securely finished off.

surface with no crustiness is the first thing they look for. Then they break off a piece. It should be crisp and short in the grain, breaking with a snap. Inside, shortbread must be of a fine, even texture and even colour. There should be no brown outside and white inside. When judges taste shortbread they are seeking a smooth feel with no graininess. Lack of beating leaves large sugar grains and causes coarse texture. Shortbread made of fresh butter, sugar, and flour needs no essences to give it flavour, but it does need salt to counter flatness. This, of course, is true for most baking. Good-quality, fresh, and wholesome ingredients give a flavour and aroma that no essence can duplicate.

Biscuits: In general the remarks about shortbread apply also to biscuits. Coarse texture and overbaking are common faults. Too-thick biscuits are unattractive; so are over-decorated or highly coloured ones.

Sponges: Here again schedules should be more explicit. A true sponge contains no butter and must not be confused with a butter sponge or a butter cake of the 3-minute variety. It would be better, too, if schedules had two classes for sponges, so that an ordinary sponge should not have to be judged against an arrowroot or cornflour one.

A good sponge is well shaped, nicely risen, with straight sides and no hangover, and is evenly browned all over. When a judge cuts a sponge across she likes to see a fine, even, moist, and tender texture which is really spongy and springs back after being pressed with a finger. Sponges that are yellow or very pale are not favoured.

The two halves of the sponge should have been evenly divided between the two tins to avoid having one thick and one thin layer. Some people weigh out the mixture into the tins to make an accurate division. The size of the tins is important, too, as it is for any cake. Too large a tin for the amount of mixture gives a flat, uninteresting cake that is bound to be dry, and if the tins are too small, the cake is very deep and possibly not evenly cooked. Sponges get a hangover if too much mixture is put in the tin.

Any filling used must be attractive and add to the fresh sweetness of the sponge or cake. Too much often looks untidy and soaks into the crumb. Strictly, sponges should not be iced or even dusted with icing sugar, but that is a point for the show committee to decide.

Fruit cakes: The outside appearance of cakes is judged first. Big mixtures should be deep, at least 3½in., preferably up to 6in. A good cake is well risen with a smooth, glossy top almost level or slightly rounded, never with a hump on it. Cracks are a fault caused by too hot an oven in the early stages of baking.

The cake when cut is judged first for colour. If dark, is it rich and dark? If light, is it pale with a golden crust? Then judges examine the crumb. Is the grain fine, close, and even, thus showing thorough creaming of butter and sugar? Is the texture soft and moist, with the fruit evenly distributed throughout? Finally, the all-important odour and flavour, are they rich and mellow?

A madeira cake should have two pieces of lemon peel on top, and be round.

Cakes lose marks most often because they are not properly cooked. Underfiring is as common as overfiring. Competitors are advised to take a standard recipe and practise with it until they can cook it to perfection. Taking time and trouble with entries is the secret of success in baking as it is in preserving.

Needlework and Knitting

Needlework

There are many different needlework classes, but the same general remarks apply to all. Judges consider first the quality of the design and its relationship to the whole article. Then they examine the stitches used to carry out the design. Are they correctly and skilfully executed? Has a variety of stitchery been used, and what is the degree of difficulty involved?

Colour is important. Is it used to carry out the design effectively? Are the colours blended attractively, or is the effect crude and garish?

Fabric, stitch, and design must be suited to the use to which the article will be put. Is the material for a supper cloth washable? Is the stitch practical? For example, are there long floating threads to get misplaced in ironing? Is the design appropriate to the use? Leather cushions painted with moonlight scenes are an example of poor choice of design. No matter how beautifully executed, an article that is not suited to the purpose for which it is intended is wasted effort, because it will not impress a good judge.

Finish also must be considered. Is the article neat and clean? Have all the ends of thread been neatly finished off, or were knots used? Is the back as neat as the front? Does the edging employed agree with the rest of the work, and is it neatly done?

Judges list as the most common failing in needlework sections the use of unsuitable designs and finishes. Painted organdie throwovers that cannot be washed are impractical and one small example of lack of fitness to purpose. An elaborately plaited cushion that catches the dust and cannot be laundered is another.

Poor colour combinations cause marks to be lost. Insipid pinks, blues, and greens are as unfortunate as gaudy oranges and purples. Subtle colour groupings and shadings contribute very much to the general effect, and care in the choice of colour gains many marks. One expert needlewoman makes this comment: "Use black very sparingly; a little dark brown or navy gives a better effect".

Judges are unanimous that greater care must be taken with stitches. They are often poorly done and lacking in variety. One sees stem stitch, satin stitch, lazy daisy, and little else. Many more interesting stitches can be done and the novelty would certainly influence the judge favourably. Use a variety of stitches, bringing in national types of embroidery like hedebo, hardanger, or assisi rather than the same few all the time.

This means that competitors would be wise to avoid stamped or traced designs. Often the patterns are poor, ill related to the cloth or its purpose, and limit the kind of stitches that can be employed. Further, judges, get very tired of looking at the old, familiar designs at every show. A fresh, original work will be far more impressive.

It appears that exhibitors could be neater with their work. It must be clean, but not washed, and the back should be as tidy as the front, with no knots, loose ends, or loops to mar the finish. The hem must be neatly done, whether it is crocheted, hemstitched, buttonholed, or plain hemmed. Any finish is permissible, providing it is appropriate to the article. Never machine a hem or use machine-made lace. If the hem has been machine hemstitched already, buttonhole neatly over it. Crochet and tatting edges, if used, should fit in with the rest of the work. They are not appropriate with peasant-type embroidery.

Knitting

Points by which knitting is judged are:—

Tension: Knitting must be firm but elastic. Too loose knitting is bad, but too tight is worse, as it destroys elasticity and the garment felts badly when washed.

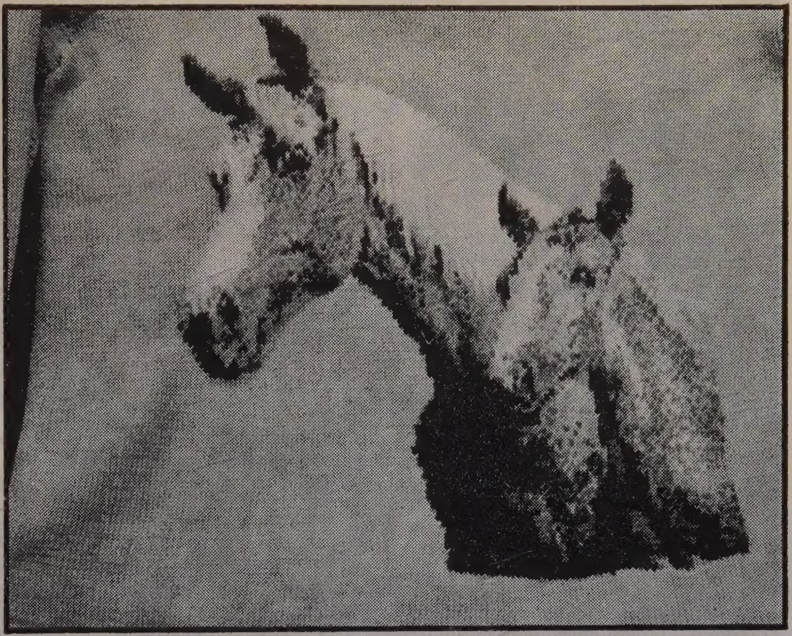
Pattern: There should be no mistakes in the pattern or blunders such as two gloves for one hand.

Proportion: Judges look to see that a garment is wearable. Its shape must be good, with every part in proportion. Sleeves that are too short or too long and neck openings that will not go over the head are bad faults. The welting on the tops of socks must be loose or it breaks during wear.

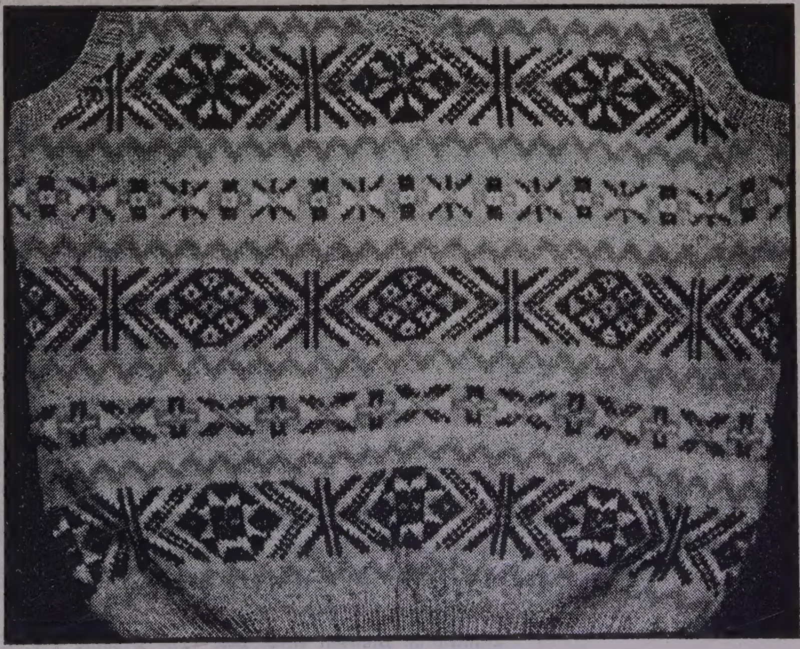
Finishings: A neatly finished garment is as important in knitting as it is in sewing. Judges examine closely the shaping, casting off, grafting, sewing together, and buttonholes. They find most faults in this last group. Good work beautifully knitted in an intricate pattern is often marred by careless finishing. Sometimes the use of wool unsuitable to its purpose, such as crepe wool for socks, causes marks to be lost, but more common faults are poor shaping or uneven decreasing, poor joining with threads and ends showing, and poor finishing—sometimes even machined seams.

Coloured work: Schedules should make a distinction between traditional Fair Isle patterns and modern patterns with figures in them. A true Fair Isle pattern always has the letters O X O on it. In all classes of multi-coloured work the pattern should be neat and even, with threads carried over or woven in neatly at the back and no joins or knots to be seen.

To improve their knitting entrants should watch all the points mentioned and should remember that careful pressing is important. After being pressed the garment should be folded neatly, secured with rustless pins, and packed attractively. Attention to detail is the secret of success in showing.



Above—Modern figure knitting. This class, so popular today, must be separated from the true Fair Isle knitting, which it in no way resembles. Below—Traditional Fair Isle designs include the letters O X O in the patterns, which change all the way up the garment.



Arrangement of a court takes time and thought to give a pleasing result. Judges' comments on colour, balance, and design are helpful to exhibitors.

How Judges Work

Very few judges use a scale of marks, though most agree that a score card would be helpful to judges and exhibitors. Judges usually work by elimination. All the obviously below-standard entries are discarded and selection narrowed to the few top-quality exhibits. Then marks may be used or points deducted for faults. If a score card were used, exhibitors could see where their faults lie and so rectify them. A conference of judges would be necessary to draw up score cards that all approve, but it would be a big step toward better shows.

Disqualification

Judges do not like to disqualify, as it discourages entrants and displeases stewards, but they must do so if the entry does not conform to the schedule. Articles entered in the wrong class, four biscuits where six were stipulated, needlework that has been washed, and so on are all breaking the rules and such entries must be disqualified in fairness to exhibitors who do abide by the regulations. It is essential for intending exhibitors to read schedules most carefully.

Improving Standard of Entries

There are three ways in which the standard of entries might be improved:—

First, show committees responsible for drawing up schedules should be most explicit in their definitions of what is wanted in each class. There is need for clarification in every section. Further class divisions would be advisable, especially in needlework; for example, in an afternoon tea cloth class an entry with a ½in. border of crochet should not have to be judged against one with a 12in. border.

Secondly, judges can help by being willing to explain the reasons for their placings. Some make helpful comments to stewards or exhibitors after judging, and when entries of bay exhibits are being judged they ask for representatives of each organisation to be present. They could help most by introducing a system of score cards, as that would give uniform show standards throughout the Dominion.

The third and most important step would be for competitors to help themselves. If they study the schedules before they enter, they will not be discouraged by seeing N.A.S. (not according to schedule) on their cards. They should be willing to learn from judges' comments and successful exhibitors but most of all they should take care. They should practise hard what they decide to enter and give close attention to finishings and presentation. That extra effort gains the coveted first prize.

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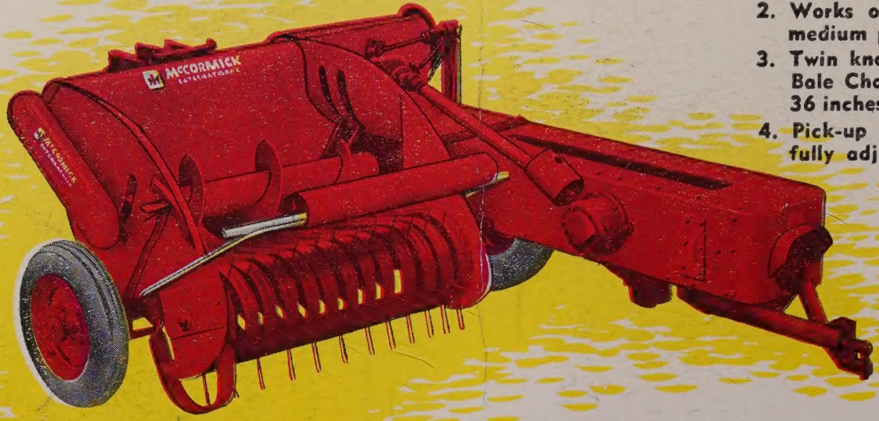

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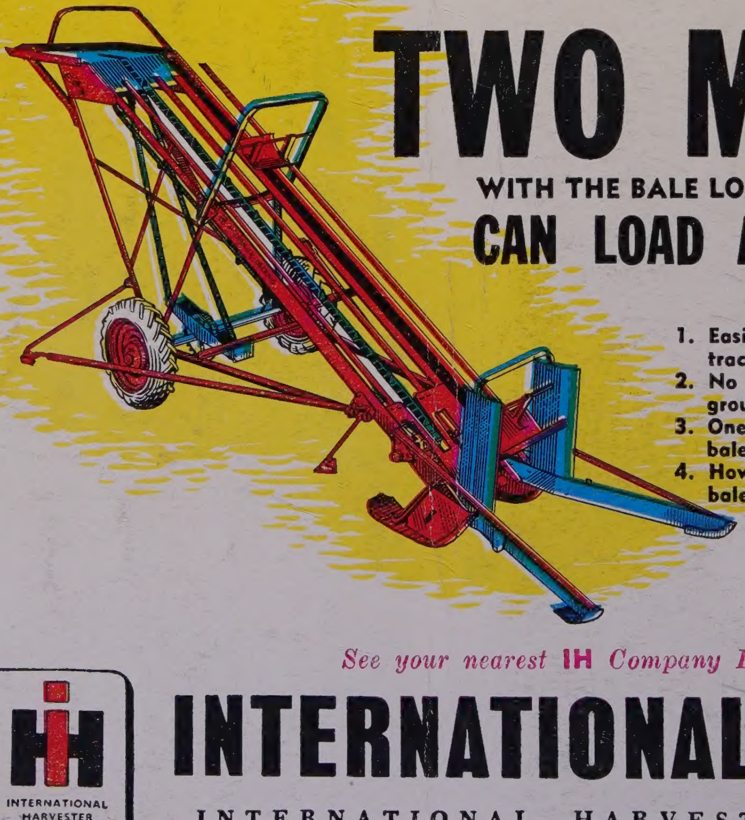

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